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NEW COMPUTER EXPRESS

Starts this week!

SHOPPING EXPRESS

Your **weekly** source for the best computer bargains – see pages 17-48

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Your no-nonsense guide to computing begins today – page 14

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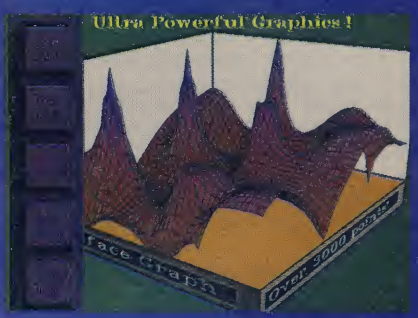
Why business graphics needn't be dull



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SECTIONS FOR Amiga • Atari ST • PC • PCW • Spectrum • CPC • C64 • QL • BBC • MSX • Archimedes

Canon's amazing micro-cum-phone-cum-fax

ALL-IN-ONE BUSINESS SOLUTION ARRIVES

A new kind of computer is sweeping competitors away in Japan – the home of new technology.

World leading hardware manufacturers such as Canon and Hitachi are wowing the Japanese in their thousands with their integrated business solutions. The best of the machines, Canon's Navi SP, incorporates a power PC, fax machine, printer and telephone. In effect users have everything they need in one amazing package.

Top brass at Canon in the UK are eagerly waiting for the green light from Tokyo in order to bring the machine here. Until then no plans can be laid down.

The computer section of the machine runs an 80286 processor with 3Mb of ROM and 1Mb of RAM. It has a 3.5 inch disk drive and there is an option on a 20Mb hard disk. Fax messages can be sent or received without paper.

The icon-based machine incorporates touch-screen technology although it also has a mouse. The keyboard slides neatly away under the monitor.

Canon has also crammed in a database, spreadsheet, comms package and word processor to make it a truly integrated business package. And although the machine is not MS-DOS compatible a special utility can be bought to allow text file transfer from PCs.

This whole package costs ¥398,000 (about £1,700) although the nature of insane dealer rivalry in Japan means it can be snapped up for as little as £1,200.

As such thousands have been bought by eager consumers anxious to pick up the latest technology. Japan has long been the centre of personal electronic gadgetry with the accent on personal. Many machines there have cute and cuddly names such as My Computer. They have been extremely successful in bringing business products into the home.

Amstrad will no doubt be watching these developments with great interest. Four years ago word processing machines were all the rage in the Far East. Boss Alan Sugar booked a flight to Taiwan and came back with the incredibly successful PCW machine.

Clearly, a machine such as this has massive potential in both Europe and the US.

Canon's creation isn't so much a triumph of innovative technology, more a showing of common sense applied to common problems.■

• Business sense: Canon's brilliant machine

Longer lasting laptop

Psion's 'longer lasting laptop PC' (*Express* 10) is likely to be launched at the beginning of next month.

Psion is still refusing to talk about the machine although details are leaking out. The machines will be A4 sized (about the same as a Z88) with a clam shell screen. It will come in two versions – one Organiser compatible and the other MS-DOS. Prices will be £700 and £1400 respectively.

Psion will be stressing the longer battery life of the machine, and the consequent cost saving, in its advertising campaigns – thought to be up to five times longer than normal laptops.

Storage will be through special EPROMs on which data can be erased and written.■

FOR SALE BY MICRO

County : Surrey
Town : Cranleigh

Price : £ 275,000

Bedrooms : 4
Bathrooms : 3
Reception : 3

Plot Size : 1/3rd Acre

Telephone : 279403
Owner : Mr Wright

A Fifteen year old detatched house completely modernised. Paula Rosa kitchen. 1/2 mile from centre of Cranleigh. Outdoor heated swimming pool with new filter unit. Large summerhouse / changing rooms. Large loft serves as games room.

Address : "Largewood" Oaklands Lane, Cranleigh, Surrey, GU6 8SS

An enormous PC database which can store up to 50,000 high-definition images is to be released in November.

PC Album **from Freehand is capable of holding a photograph and salient details (as shown above) of every house in a town the size of Derby. Users can simply port images in through a video capture camera or scanner.**

The entry level price of the program is £1,250 although that can rise to an astronomical £15,000. Anyone prepared to pay that would get the complete system including optical drive, camera, printer, computer and the ability to store masses of information.

It allows users to capture 32,768 colours on screen simultaneously and provides 500 text fields per record. Freehand reckons the program will go down well with museums, recruitment agencies and the like.■

• Arting around: Create your own animations

That's not all folks...

A cartoon animation program for the Amiga and PC is to be launched here called *Fantavision*.

Publisher Domark says the program takes the hard work out of animation and can be used by beginners and seasoned cartoonists alike.

For instance, if a user creates an image of an aeroplane on a runway, and then another of it in the air, the program will do the bits in between and run a sequence of the plane taking off. *Fantavision* costs £39.99. Domark is on 01 780 2222.■

PIRATES TURN TO THE CONSOLES

Pirated copies of Nintendo and PC Engine cartridges are circulating in the UK – and are being sold as legitimate products.

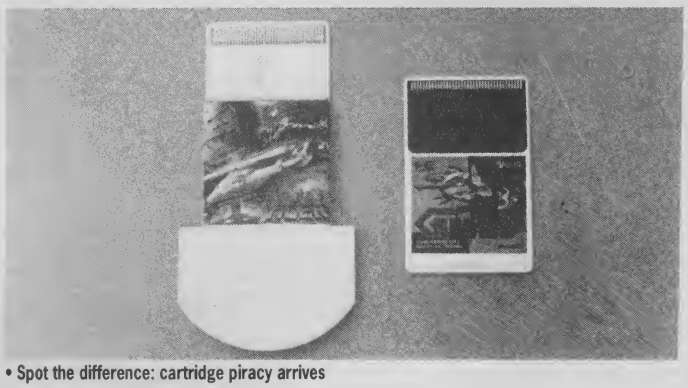
The EPROM-based cards are being manufactured in Taiwan and Hong Kong and distributed via large companies in Japan. Pirates have hitherto been unable to crack the cartridges. However, clever little companies in the Far East have succeeded in "blowing" the PC Engine and Nintendo EPROMs.

Indeed, cheap gadgets designed to aid cartridge copying are being sold in the Far East. They can be linked up to a home computer and the data can be downloaded onto disk. The crackers then copy onto an EPROM which is then placed into a plastic moulding.

The pirates can't get the data on small cards such as those used for the PC Engine. Illegitimate cartridges are larger than normal items with a fat rear.

One company known to be selling pirate cartridges here is PC Engine Services. Boss Robert Zengalli admitted that he stocks a PC Engine game called *Tiger Heli*. He also said he has access to every game for the PC Engine and Nintendo through Japanese contacts.

Zengalli claimed that he was under the impression pirated cartridges could be sold here if they have not been officially registered or launched in the UK. However, FAST's Bob Hay described this as "wholly incorrect" since copyright need not be registered in individual countries.



• Spot the difference: cartridge piracy arrives

Zengalli then said he would cease selling *Tiger Heli* or any other pirated cartridge. Another argument he used was that original versions of *Tiger Heli* had "run out" and only pirated copies are left. He said that in the future he would simply do without the game if legal versions are not available. The game was being sold at the full price of £29.

Express obtained a copy of *Tiger Heli* and, although the title screen containing the software house's logo has been wiped, the game itself runs perfectly. The packaging for such games is clearly substandard though coming in a cardboard box rather than hard plastic.

PC Engine's manufacturer NEC has no clear policy concerning its product for the UK and legal implications aren't clear. No-one was available for comment. Nintendo's distributor Serif says it is aware of the problem and says Nintendo will use law courts to curb pirac

Financial director Robert Wylie said: "It's not a major problem in the UK as yet because the market is relatively small. But it is happening in Japan and the US. Nintendo is a hard company and is will definitely look at the possibility of legal action. But it's difficult to track people down especially if they're small operations working out of a room."■

Kidnap charge

It emerged last week that the man charged with blackmail following the kidnapping of businessman Victor Cracknell used to be the boss of the once influential company Modem House.

Keith Rose is currently being held in custody after his arrest last week. Cracknell had been held for five days as negotiations went on with his millionaire father. The kidnappers had demanded £1 million and picked up £140,000 before Cracknell escaped. He had been tied to a tree in a wood in Devon.

Rose's company stopped trading two years ago.■

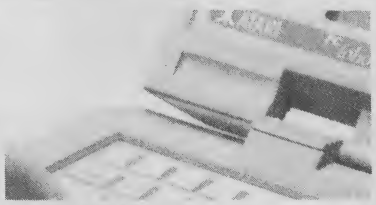
Portfolio bug bugs Atari

A bug in Atari's Portfolio has been keeping technical people busy over the past few weeks as the hardware manufacturer pumps thousands of the tiny wonders out of its factories.

Seemingly, a glitch in the operating system has been crashing some of the machines and then a message comes up saying 'Divide by 0'. Unfortunately, the only way of curing this is by a hard reset. This has the adverse effect of wiping all data on the machine.

Atari's technical department has apparently been kept busy with a number of telephone calls from disgruntled users. However, the hard reset is a relatively simple operation.

Atari says it's an "isolated incident" and isn't officially recognising the bug. A spokesman said: "There are always going to be small problems with new products. If anyone comes across such problems they should let us or the dealer know."



• Portfolio: wee problem

Meantime, Atari was last week hinting that it would be letting "a few people" peek at the forthcoming STE (*Express* 33). At the time of going to press sundry journos were winging their way to Dusseldorf hoping for a look at that machine, a higher end ST (the TTP) as well as numerous other long awaited arrivals.■

Pin money

Low cost printer manufacturer Star has launched another version of its popular LC10 model.

The nine pin LC10 II has been designed with speed in mind – it can handle 180 characters per second in draft Elite mode (compared to 144 cps on the original LC10). It costs £229.

Star has also announced two other models for higher end users. The £499 LC24-15 can handle A3 size paper sheets and a bottom feed facility which is useful for printing label. There's also the LC15 which is a wide carriage version of the LC10. Star is on 01 840 1800.■

German invasion

Grand Slam has tied up a deal with a German programming team which will bring seven new releases over the next nine months.

The games will be released under a specially created label called Thalion. This is something of a departure for Grand Slam which has recently concentrated on licence tie ups.

Primesoft's 18 programmers have been beavering away on the new projects for the past 18 months. The first five up are *Chambers of Shaolin, Dragon Flight, Terramis, Seven Gates of Jambala* and *Warp Warp*. Grand Slam is describing them as "breathtaking".■

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MANY INTO ONE

It is surely only a matter of time before Amstrad brings out an all-in-one machine like those currently popular in Japan. These machines offer fax, telephone, computer and printer all in one package. With Amstrad's capacity for judicious corner-cutting, it could just about make it onto the market for under a grand, but certainly it would be under £1500.

Perhaps these multi-component machines are more an illustration of 'the shape of things to come' than faster processors or 'intelligent' neural networks. The consumer market has now got so used to the concept of the personal computer that an all-in-one package can be advertised as including a computer without further explanation. And the present state of the art seems quite adequate for the sort of uses most of us require – playing games, word processing, keeping name and address lists and so on.

No technological advancement will change that too much in the next decade or two.

So it follows that the logical next step for the manufacturers – always aiming to offer us bigger and better machines for our mone – is not vertical, but horizontal expansion: more bits of existing technology in the same package, rather than more powerful versions of what we have already. The same pattern, in fact, that has produced the incredibly cheap integrated audio systems that offer record player, double cassette deck, tuner, speakers and amp for under a hundred quid.

Prepare, then, not for home versions of the NCube – the world's fastest supercomputer – but for cheap all-in-one units including the equivalent of an Amstrad PC plus fax card, telephone, word processing and general utility software, touch screen, mouse, hard drive, separat infrared keyboard, built-in 24 pin dot matrix printer – maybe even a smart card based detachable pocket unit too, to use on the train or in the hotel.

These machines are a couple of years away, but they're surely coming.

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HOME JUST MELTS AWAY

Substantial mail order outfit Homesoft has ceased to exist – apparently blaming the hot summer for its demise.

Details were scant at the time of going to press although debts are thought to be substantial. The bad news follows the demise of Clik earlier in the summer with debts of £140,000.

Homesoft is proportioning some of the blame on the hot summer which has driven many younger computer owners away from the micro and into the sunshine. Unfortunately none of the directors were availabie for comment at the end of last week.

Homesoft was one of the leading mail order houses in the low cost computing sector selling everything from games to monitors.■

Getting the fax

A neat little device for on-the-move businessmen is to be launched next month. It's a portable modem which can handle fax messages.

The WorldPort 2496 can be used for normal data transmission or to send faxes. No need for a fax machine or a printer – all you have to do is prepare the document on the go, plug the modem in, and send the message hither and tither. It costs £699.■

• WorldPort: comms on the move

DTI SLAMS 'SOFT ON HACKERS' POLICY

Eric Howe, the administrator of Britain's weak computer privacy laws, has been slammed by the Department of Trade and Industry for his softly softly approach to hackers.

The CBI wants all hacking to be criminalised although Howe says it should be more selective. In his report to the Law Commission he said companies should be more aware of their own computer systems and should do more to protect them.

Replying to the DTI's criticisms he said: "You've only yourself to blame if your neighbour's cattle get into your unfenced field." He went on to to say: "Mere misbehaviour by youngsters is not a matter which we normally would seek to criminalise unless it has some significant effect." He did recommend dealing with those who persistently hack into other people's systems.■

Flight sim's near miss

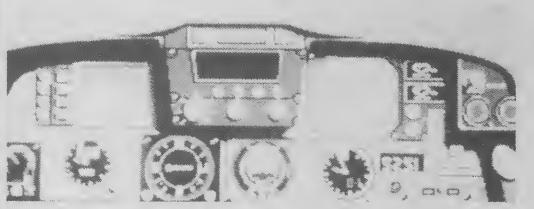
You know what they say about the best laid plans. Poor Digital Integration has found out to its cost that things rarely go as they should – especially when it comes to programming.

After four months of solid grafting the programmers had finally managed to port the bright flight sim *F-16 Combat Pilot* over from the ST to the Amiga, with all the enhanced graphics and sound thrown in to take advantage of the machine.

However, with just a day to go before copies were shipped out the firm found, to its horror, that it would not run on certain Amigas. Bosses went into temporary headless chicken mode and then spent 48 gruelling hours attempting to track down the problem and rectify it.

In the simplest possible terms the computer was under the impression that the left hand mouse button was constantly pressed down. So as soon as the game got to the language selection (i.e English, French or German) the game froze.

"It only delayed us for 48 hours but it was a real slog. Everything was going so smoothly and then we simply had to go into hyper mode,"



• *F16*: heading for a crash landing

EVERY HOME SHOULD HAVE ONE

Cripes, it's a tad hefty for a portable but this is none other than the "go anywhere" trolley.

Manufacturer Knurr tell us that the "distinctive" trolley can be wheeled anywhere around the office and can be used to shift all manner of computing goodies weighing up to 300kg. Anyone who fancies getting in on this technology should call 0480 496125.■

SNIPPETS ● SNIPPETS ● SNIPPETS

Animation freaks can tuck into a four disk line up from Clares launched this week. All contain impressive Archie animations including Close Encounters and Toy. The disk cost a tenner and can be bought from 0606 48511...

It was doubles all round at Opus recently. The British PC manufacturer managed to flog 3,000 of its PCs to the Post Office for a tidy £3 million...

Chain store Dixons has given the impressive BBC A3000 a boost by taking it on in 20 of its flagship stores. Expect some good bargains...

News reaches us of one Amstrad 2286 owner who was having his machine changed by Dictaphone. Everything seemed to go according to plan, the removal men left, and he sat down to some trouble free computing. However, he was interrupted by a neighbour 10 minutes later who informed him that a computer was sitting pathetically on the pavement. Apparently, Dictaphone had driven off without it.

• Enhancements: *Deluxe Paint II*

Arting around

Electronic Arts has announced the availability of an enhanced version of its popular paint package *Deluxe Paint II* for the PC.

The firm says its up to date version features ". a vast array" of new bits and bobs for the arty amongst you. The primary new additions are poster size printing which will allow creations up to nine times larger than the original. There's also a gallery offering a slideshow for presenting work and a picture preview before opening documents.

Owners of the original can pick this up for £30 although newcomers will have to fork out £99.■

Tandy PCs move out

Tandy has launched two new portable machines into the relatively low cost sector.

The 1400HD and FD cost £1699 and £999 respectively with the former boasting a 20Mb hard disk. That also sports the latest in Supertwist LCD technology with an 80 character by 25 line resolution – equal to a full size monitor. There's also an RGB monitor output for a link up with a colour screen.

Both machines will be available from all 300 of Tandy's stores around the country.■

Chip confusion

Confusion is reigning in the US microchip industry as conflicting reports are published about the production of the new PC wonder chip the Intel 80486.

According to some sources production of the chip, which will make PCs run many times faster than at present, is being seriously delayed. Makers Intel deny this completely and say all is on schedule.■

MASSIVE FLOPPY DISK HOLDS 20Mb

Technical boffins at Fujitsu are currently working on an incredible new floppy disk system which could leave competitors standing, writes Simon Williams.

The large capacity drive will be able to handle a monstrous 22Mb unformatted with an access time of 65 milliseconds – that's faster than low cost hard disks. Fujitsu intends to use them for laptops and portables which indicates a low power consumption. However, such a product clearly has wider implications.

A user could run a 22Mb disk housing a complete *dBase* environment or *Ventura* DTP with all the fonts imaginable. Bang in a different disk and you could be deep within *1 2 3* with a customised set up tuned to that application.

One would have thought this will cost a fortune. Not so, my sources tell me. The drive is likely to cost around £150 with the disk weighing in at between £10 and £20. A whopping 120Mb costing less than £250 is a brilliant bargain – a similar hard disk would cost six times as much.

The product us currently being beta tested and shipping is likely to begin before Christmas. Fujitsu is remaining tight lipped on the subject.■

Tax dodgers tracked down

People earning more than they tell the taxman are being hunted – by a computer.

The Inland Revenue is to install a computer designed to track down those whose expenditure is above their declared income. The massive computer holds a list of all the tax returns of everyone in the country. It also has access to land registers and shareholder lists.

It works on a random basis and picks up on people spending too much on expensive goodies such as yachts and second homes.■

AS THIN AS THEY COME

As predicted last week Zenith will indeed be launching a slimline PC – the MiniSport (above).

It will cost £1,300 when it hits the streets this autumn running at 8MHz with two disk drives it will have 1Mb of RAM. Zenith, like the increasing number of mini PC manufacturers, will be hoping to tap into the cool and trendy business sector.

Industry watchers here and in the US are predicting the demise of the luggable.■

• Good Lords. CD-ROM in the house

Their Lordships' CD-ROM

In between their usual nail-biting debates the members of our House of Lords can indulge in some sifting through a new CD-ROM system installed in the library.

UK manufacturer Research Machines has loaned the system to their Lordships for evaluation. Each CD disk carries the equivalent of a complete set of encyclopaedias.

Chief librarian Roger Morgan commented: "The time spent searching for information is reduced from hours to seconds and the disk is small enough to fit in your pocket."■

Splashdown

A new games development team reckons it's going to make a big splash with its first game *Adeptus*.

It's the first product from twosome John Holmes and graphic designer Jalal Miah. Featuring full screen scrolling with multi level parallax the game is only missing two things. Sound effects and a publisher.

Big Splash Software is hoping a sound effects skillster for the ST will give them a call as well as a publisher willing to take the game under its wing. Call 01 408 6962.■

• *Adeptus*: Sounding out partners

ST BEAT BOX £19.95

Is it a drum machine ? Is it a Song Construction Set? Is it a new concept in digital music? The answer is yes! It's all three and so much more It's.....Beat Box!
Beat Box brings the world of music to your fingertips. It's a full blown polyphonic song construction set that turns your ST into a drum machine and digital sequencer. Never before has your ST made this kind of music with so little effort. Now anyone can be a master composer. No musical knowledge required!
The easy to use GEM interface makes it simple. Just point and click to create fascinating drum, voice or musical patterns. Up to 30 different patterns can be combined and arranged to form a complete musical composition.
Play your songs through your ST monitor, Digisound Professional, ST-Replay or Navarone (Hippo), in 4 voice polyphonic, digitized sound.
Beat Box comes with over 35 ready to use sampled sounds, so you don't even need a digitizer to become a master digital musician. Beat Box fully supports Digisound, ST-Replay, and Navarone (Hippo) sound digitizers, so the supply of sounds is limitless!
Taking a Beat Break is more fun than any computer game. And Beat Box includes a public domain Song Player, so you can share your musical masterpieces with your friends.

WELCOME TO SUPER PROGRAMMING!

Programming languages are flexible. You have complete control over HOW you do things. But WHAT things can you do with a normal programming language? Draw a line on the screen? Print a string of characters? It takes months of development work to build something useful from these simple operations. Why can't a programming language take advantage of sophisticated functions available in existing specialised programs? Imagine a basic like language with commands like "Draw a picture with CAD-3D" or "Print a letter with First Word". Or even "Dial Micronet with Flash every day at 11pm, check E mail and save it to disk" Well you don't have to imagine it. This programming is here and it is called:

ST CONTROL £59.95

ST Control is a compiled language that can drive any program(GEM or non -GEM) in real time. Here's what you can do with it:

✳ **Record any sequence of operations in any program(s) and convert into a text script.**
✳ **Paste additional pieces of scripts recorded or written earlier and saved to disk**
✳ **Edit the script with a built in text editor, adding things that cannot be recorded-FOR NEXT loops for repetitive operations, variables and maths operations to change something with each repetition, mouse and key input for real time playback control (yes!) and even feedback input from the controlled program. Compile the script and then run it at any speed.**
✳ **Stop playback edit your script and run again-without quitting the controlled program(ST Control is a special desk accessory that can be entered even from non GEM programs) ST Control language features FOR NEXT loops, IF..THEN statements, logical operators, subroutines, floating point arithmetic, multi dimensional arrays, arbitrary expressions, trig functions and much more. There is also a trace function for real time debugging of scripts. ST Control works on any ST colour or monochrome.**

C COMPUTERHOUSE

The people who brought you the Controller Card present:

SWITCH BACK £69.95

(requires 1 Meg. of ram)

✳ **Imagine saving almost any game at any point, then being able to return there as many times as you like.**
✳ **Imagine the "ULTIMATE BACK-UP" Utility that actually UNPROTECTS programs as it copies them. Lets unprotected programs be stored as files, run from a hard disk, or ram disk.**
✳ **Imagine saving three or more protected single sided disks on just one double sided disk.**
✳ **Imagine being instantly able to switch back and forth between two independent programs, games, business applications utilities.**

Now stop imagining and get SWITCH BACK !
It can do all this and more

SWITCH BACK is a revolutionary new hardware and software package that lets you get more from your ST, MUCH MORE!! GAMES 'Switch Backs' gaming features lets you instantly save most games, then continues playing. If you get into trouble you can switch back to where you were as many times as you like..... BACK UPS 'Switch Back' will function as your favourite back-up program allowing you to save whole protected disks to files for archival purposes. It can also automatically unprotect a program and save it as a standard TOS file. It is perfect for running protected programs off a hard disk.
SWAP 'Switch Back' lets you load just about any two or more programs into your ST and switch instantly between them. It works with games, business programs, utilities, compilers etc. Although only one program is running at a time, the other is available instantly, right where you left off!

The 'Switch Back' hardware plugs into your printer port and has a 'pass-through' connection for your printer

SPECIAL ST PROMOTION PACKS

SYSTEM 3
MEGA 2 ST COMPUTER
SM 124 HI RES MONITOR
SLM 804 LASER PRINTER
TOTAL £1629.00

SYSTEM 1
520 ST FM COMPUTER
SM 124 HI RES MONITOR
STAR LC-10 NLQ PRINTER
TOTAL £515.00

SYSTEM 2
MEGA 1 ST COMPUTER
SM124 HI RES MONITOR
STAR LC24 10 LQ PRINTER
TOTAL £845.00

520ST-FM Explorer pack £265
520ST-FM Super Games Pack..£355
MEGA 1 ST Professional Pack..£519
ATARI Megafile 30 Hard Disk £439
ATARI Megafile 60 Hard Disk £599
LC10 9 pin Mono NLQ printer ...£154
LC10-C Colour NLQ printer £185
LC24-10 24 pin LQ printer £235

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JAPAN: THE NEXT WAVE

'Personal work tools' are the latest thing in Japan. Rob Ainsley and Andy Storer nip over to find out the slant of consumer computing to come...

一太郎

• Forget those woodblock print images of simple peasant farmers, geisha, samurai and ninja. Even in the smallest, most out-of-the-way hamlet, the rice paddies will be owned as a sideline by office workers for Canon, NEC or one of the other big companies in the city. And that little village store with the beer vending machines outside is as likely to sell the latest CD ROM players, pocket TVs, games consoles, faxes and portable word processors as it is vegetables and rice.

• Akihabara, in central Tokyo, is the world's biggest marketplace for new consumer technology. Here you can pick from dozens and dozens of side street stores selling the very latest technology at incredibly low prices – Sega consoles for under £100, personal computers for under £100, pocket TVs for £40, walkmans for a fiver. But Japan's distribution is so well organised that all the new gear arrives in the small town and village shops in a week or two.

The Japanese produce more powerful computers, more impressive games, and smaller and cheaper hardware than anyone else.

The reasons are simple – the Japanese are more ferociously educated and work harder than anyone else – and while the results may be no good for our balance of payments, they're impressive, and drag the rest of the world's economies along with them. And what's new in Japan comes to the West a year or two later.

According to the *Financial Times*, Japan this week overtook the US as the world's richest nation. It's probably the world's most computer-conscious society: the commuter trains are packed with schoolkids practising English on their hand-held language teachers and businessmen mulling over the day's figures on their laptops. Average time between personal computer upgrades is 18 months and the old ones just get ditched. Nintendo makes more money from selling its games consoles there than all the rest of the software houses in the world put together.

Then there's the eternal quest for miniaturisation. Maybe it's to do with Japan being the most densely populated country in the world, or the Oriental desire to make perfection and beauty small and simple rather than large and grand; whatever the reason, they're getting rather good at it. Sony designed the Walkman, pocket TV and pocket CD player in Japan, and the clear trend in their consumer market is making everything portable and 'personal'.

If you want to know where our computer market is going – in the sense of what we'll be buying and using in the next few years – look no further than Japan. Their booming consumer computer market leads the world. What Canon, Hitachi, NEC *et alia* bring out in Tokyo today, Alan Sugar and company bring out in Dixons, Comet, Laskys and so on tomorrow...

• Akio Morita, head of Sony, had a brainwave in 1980: it was called the Walkman. It was on sale in Japan in July 1979, came to West a year or two later, and now over 100 million have been sold worldwide...

• The 'dedicated word processor' consumer boom started in Japan in 1984. Amstrad's chairman saw the potential of this on one of his visits and brought out the PCW in England late in 1985. 1.5 million of the machine have been sold...

• 24-pin printers became popular in Japan in the early 80s to cope with the detail in the Chinese characters they use to write their ridiculously complex language. Now 24-pin printers are becoming more popular over here...

• CD ROM players are selling in droves in Tokyo. Japan's computer market – especially the booming leisure sector – is moving quickly over to the CD

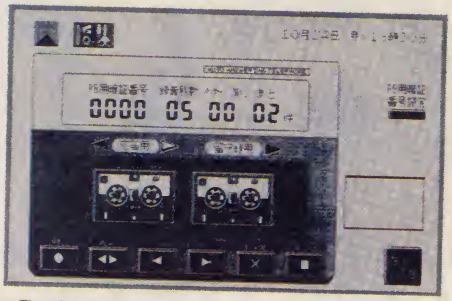
• The latest Japanese trend is the 'personal work tool' – an all-in-one bundle of word processor, printer, computer, fax and telephone

Fancy a glimpse of the future? Just get on the next flight to Tokyo, take the Yamanote line to Akihabara, and follow the crowds. ➤

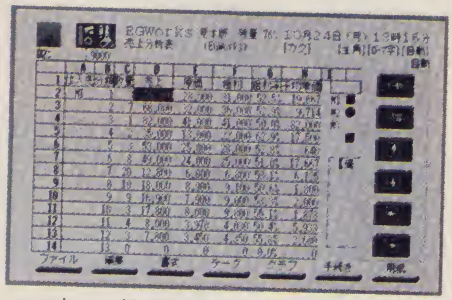
STATION TO STATION: The nw

The Navi SP is the very latest thing from Canon – a 'personal station' advertised as the essential tool for business and private use. Just out this month and currently on sale only in Japan, it comprises a 3.5 inch disk, fax, telephone, computer, printer and word processor all in one box. It works by touch – to select something you just point to the appropriate box on the mono screen, though there's also a separable keyboard. The recommended price is ¥398,000 – around £1,700 – but it could be just over a grand in the shops.

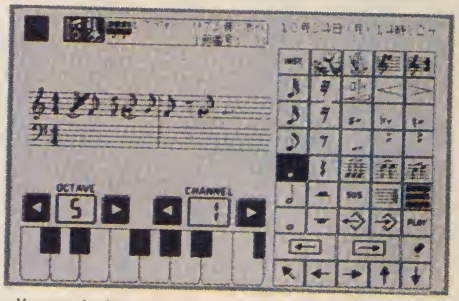
• The touch screen means you can select things by literally pointing at the icon



• There's built-in answerphone software...



• ...and spreadsheet, as well as a database and word processor



• You can also buy extra software like this music package

As well as built-in features such as calendar, appointments diary, alarm, database, spreadsheet and comms utilities, you can buy a range of extra software. This includes MSDOS converters, network utilities, art and music packages, games and even desktop publishing programs.

The computing and word processing side of the machine is fairly standard – 80286 processor, 3 meg of ROM, 1 meg RAM, a 3.5 inch drive, a 20 meg hard drive optional – but that's just the start. The fax doesn't have to produce paper copies – you can store pages on disk and 'print' them to screen. And you can prepare your pages on screen and send them without committing them to paper.

The dot matrix printer can be used with the fax, or to produce word processed documents and reports. It produces up to 32 dot detail at 20 characters per second, down to 16 dot detail at a faster 38 characters per second (for Japanese characters – the English letter equivalent would be 24 and 9 pin detail). The telephone and built in modem can work up to 9600 baud. The touch screen is 640x400 white.

It must only be a matter of time before this sort of machine is taken up over here by someone like Amstrad. Watch this space...

CONSOLE YOURSELF

Something of the popularity of computer gaming in Japan can be gleaned from the massive queues which form at shops selling the latest hot release. In comparison, the January sales at Harrod's pail into significance. At the launch of Dragon's Quest, fans clammered all-night outside stores and fights broke out for the last copies of a batch of three million which sold in a week. But it's not just the software which appeals.

When Sega's 16 bit Megadrive console was launched in Tokyo the initial production run completely sold out in two days whilst half a million PC Engines sold in the first week of release. And its a phenomenon spreading across the States too. Industry sources expect Nintendo to have achieved a 26% market penetration of US households by the end of this year, representing sales of $3.4 billion total with software accounting for over 100 million units. One game, *Super Mario Brothers* has sold 9.1 million copies in less than two years.

Exactly why games and consoles are so popular in Japan is perhaps best explained by the Japanese lust for escapism. But living in a country right on the cutting edge of new technology it's hardly surprising they'll go bananas over the latest hardware - and the list of machines they have to choose from is certainly impressive:

• The PC Engine has some of the most realistic arcade conversions around

PC ENGINE

A six-channel sound, £175 super small console that delivers incredible graphics and is best described as pocket arcade machine. The recently released *GunHed* is arguably the best shoot-em-up to appear on any machine at any time.

Running off memory cards the size of bank cards, and now bundled with a CD-ROM player, the PC Engine was years ahead of its time when it first hit the streets in '87. Expect a 16-bit version early next year.

SEGA MEGADRIVE

With FM stereo output and 64 colours on screen at any time, the Megadrive beats all other 16-bit opposition hands down. At £200 it delivers the kind of power only seen in custom arcade machines.

GAMEBOY

Nintendo's cut-price portable video game system with interchangeable cartridges and stereo sound. With a 16-bit version, the Famicom, almost on the Tokyo streets, Nintendo can expect to clear up the world over.

• Sega's Megadrive provides raw power for console users

• The GameBoy is Nintendo's main contender in a crowded marketplace

BEST OF THE WEST

At one time it was fair to say that Japanese technology owed its success to drawing heavily on Western innovation, minimising production overheads, maximising quality control and undercutting on price. But the current prominence of Japanese innovation is due to the massive investments in Research and Development in technology started in the late sixties. In short, Japan is now reeping the rewards and in the process not only setting the pace but defining the trends themselves. However, increasing integration and minitiarisation aren't solely confined to Japanese design - there's a handful of American and European companies coming up with products that take the Japanese on at their own game and beat them. In the world of computing, the best the West has had to offer recently consists of a range of machines that can truly be said to represent landmarks in technological design and functionality.

THE PORTFOLIO

Atari snapped up the rights to the little beauty as soon as they heard British company DIP had developed this ultra-compact pocket PC. With a folding lid comprising a Supertwist LCD screen, a minute QWERTY keyboard not much bigger than the size of your hand, MS-DOS compatibility and 128K smart-card style storage, Atari rightly expect the Folio to sell in droves for £230.

THE LYNX

Another innovation from Atari who, perhaps more than any other company in the history of computing, has recognised, seized upon and sold innovation at an affordable price. The Lynx is the world's first hand held, colour games machine. A 3.5 inch colour screen is able to display 16 colours from a palette of 4,096 - but if this weren't enough the chip at its hearts shifts at an

new marvels from Japan

Another all-in-one, this time touted as a 'personal work tool', the Hitachi Proset also boasts a computer-word processor-printer-phone-fax line up.

There are two 3.5 inch disk drives holding 1.2 megs and an optional 20 meg hard disk. The printer manages 16 dot detail and the monitor has a colour screen. Optional extras include a genlock device and scanner to enable video and printed images to be put on disk and manipulated.

The built-in software is icon-based and works via an attached mouse or through the separable keyboard. A Japanese word processor, graphics package, mailing and labelling software are supplied. There's also an address database, memo pad, calendar and comms utilities. Adding appropriate interfaces can let you join it up to a network.

The Proset costs ¥593,000 (£2,500) – ¥498,000 (£2,100) for the model without a phone – though shop prices are well below this.

• A built in telephone even allows your computer to dial the number for you while you type

HOW COMPUTERS TAMED THE WORLD'S HARDEST LANGUAGE

Japanese word processors are now installed in virtually every home and office in that country because of the complex written language.

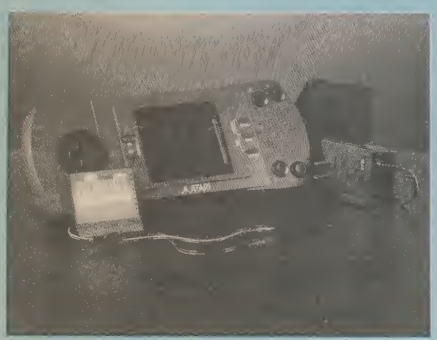
Japanese uses two alphabets, one for writing Japanese words phonetically and another for for Japanised foreign words (like 'kompyutah' and 'wahdo purohsesah'!). In addition it uses several thousand Chinese characters. Each can have from two to ten ways of pronouncing it depending on the context. They can only be learned by sheer hard slog.

This proved a problem for offices. Japanese typewriters have 2,000 keys and even the fastest operators can only produce about ten words a minute. So all business correspondence, reports and memos etc. had to be handwritten, which was time consuming and costly – until word processors arrived.

Now you just key in the word you want in the phonetic alphabet and the possible characters appear on screen for you to select. Even this can be tricky – Japanese has many words pronounced the same. 'Seiko' has twenty meanings varying from 'steel factory' to 'sexual intercourse' depending on the characters you use.

• The Folio - a design concept developed by a British company, bought by an American, and following Japanese trends towards ever increasing minitiarisation.

• The Protocol A4 - a case of the wheel turning full circle?



• The Lynx is all American technology and will sell there for as little as £95.

incredible 16 MHz. Its 4 channel stereo sound output runs through to Walkman headphones and software comes on 16 Meg smart-style cards.

THE PROTOCOL A4

The Protocol A4 is the size of an A4 pad only three inches thick and will run any PC software on 3.5 inch disk. As such it represents the world's first true PC portability. It's also something off a first in another way too. Although the machine is sold by British company API Electronics and is badged as such, the design, development and technology all came from Taiwan. It's one of the first examples of Western company drawing on Far Eastern expertise, boxing it up and selling it on. A process, one could argue, the Orientals originally masterminded.

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GET SMART

With hypertext, knowledge bases and expert systems computers are beginning to show signs if intelligence. Andy Storer gets to grips with a group of PC desktop experts...

Expert and knowledge-based systems are ideal for use in any fields that require regular consultation with a set of hard facts. Thus engineering, education, law, management, banking, insurance and manufacturing are all areas where machine-based consultancy is a valuable and cost-saving reference system. But the list is endless, for any field that calls for intelligent tutorials, smart manuals, procedure guides and complex diagnostics will benefit from the interactive training and education such systems can supply.

But truly intelligent systems are the stuff of sci-fi dreams. Interactive computers, able to display human qualities of understanding and learning, are still years off despite advances in areas like neural network theory. While many would argue that significant change will only come about with the advent of fundamentally different hardware architectures, in the meantime the quest for artificial intelligence centres on the software of expert systems and hypertexts.

Rules rule

Expert systems are knowledge bases in which facts are stored according to specific rules. These data arrays can be thought of in terms of tree structures; a specific input following a path through a series of multiple choice questions towards a particular conclusion. At any branch in the system the actual processing is dealing with simple IF...THEN constructions, which are flagged when passed and weighted with certainty factors. In this way, sketchy areas of knowledge, where precise detail is incomplete or unknown, can be accorded a probability factor and a 'reasoned' guess or inference supplied.

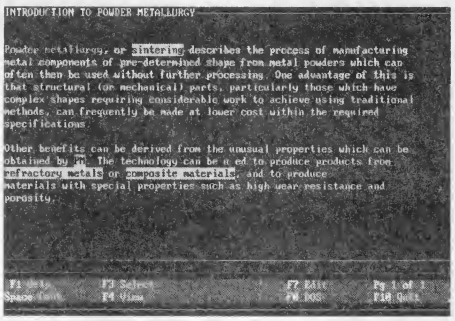
This is at least the theory. In practice, off the shelf expert systems - empty shells which you fill yourself - require a great deal of time and trouble to set up. It's not so much the actual compilation of facts constituting the body of knowledge in question that's crucial as the experience needed to organise that data into meaningful relationships. So the essential factor in deciding which system to purchase is the degree to which it offers an easy way of structuring and controlling a maze of information.

Part of the problem with expert systems is their rigorous nature. Of necessity they need to be formally structured with little room for manoeuvre. Hypertext is a way of adding flexibility to their management since, in essence, it allows a way of flipping into avenues of interest without losing the thread of the original query. Hypertext allows you to link concepts, logic and procedures in a non-linear fashion and thereby follow a train of thought or delve into deeper levels of detail. At its simplest level it works through highlighting key-words or 'topics' in text displays which can be given attributes or values and logically connected to similar occurrences in other areas of a knowledge base. Used in conjunction with expert systems, hypertext provides a means of navigating complex databases with the ease and interest of a browse through an encyclopaedia.

KNOWLEDGE PRO

• PC • £329
• Knowledge Garden • 0743 231172

Approximately 1.2 megabytes of program squeezed onto two 5.25-inch disks, *Knowledge Pro* is a comprehensive hypertext package which allows you to link images, text, calculation and expert system data. Points on .PCX format pictures can be designated as 'hot-spots' which, when clicked, will take you to other areas comprising the system. Lotus *1 2 3* and *dBase* files can also be incorporated into the environment. With some 120 commands at your disposal, you can use an easy to learn command language to program information windows, menus and lists and control file input/output access to external programs.


INTRODUCTION TO POWDER METALLURGY
Powder metallurgy, or sintering describes the process of manufacturing metal components of pre-determined shape from metal powders which can often then be used without further processing. One advantage of this is that structural (or mechanical) parts, particularly those which have complex shapes requiring considerable work to achieve using traditional methods, can frequently be made at lower cost within the required specifications.
Other benefits can be derived from the unusual properties which can be obtained by PM. The technology can be used to produce products from refractory metals or composite materials, and to produce materials with special properties such as high wear resistance and porosity.
F1 Help
F3 Select
F7 Exit
Pg 1 of 1
Space Mark
F4 View
F9 DOS
F10 Quit

• *Knowledge Pro* uses hypertext in a clear and straightforward manner - any text may be highlighted and used to take you into related areas.

THINKSHEET

• PC & Archimedes • £115
• Fisher-Marriot Software • 0203 616235

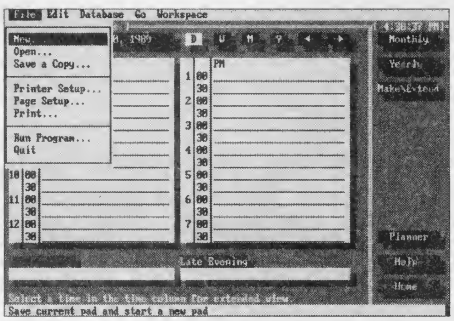
ThinkSheet is described by its authors as a three-dimensional thought organiser, a tool for for developing projects based on information bases. The package is card based - each card deemed to reside on a large 'board' of thoughts which can then be spread out, arranged, related, connected and classified. It can thus be used as a freeform database allowing a user the facility to pass through 'doors' to other boards of facts. As such it's ideal for planning work or organising applications where no precise relationship exists between disparate facts.

HYPERPAD

• PC • £114
• Software Paradise • 0222 882334

Hyperpad is an easy to use browsing, typing, painting, authoring and scripting application designed to alleviate the complexities of database programming. 'Pads' are used, like the 'cards' of *Hypercard*, to store information onto which 'buttons' may be attached which are allocated functions.

Clicking on a button can flip you to a related pad - say taking you from a telephone notepad to an automatic dialler or from a calculator to an expense form. The built-in scripting language, containing over 300 commands, allows you automate pad and button instructions to perform a range of functions from MS-DOS utilities to custom database sorting.



• *Hyperpad* combines pull-down menus with clickable buttons to enable you to navigate a range of database information

The baby of them all

Hypercard's release on the Macintosh back in 1987 caused something of a stir since it represented a radical advance in database organisation and navigation. Given away free, the card-based system is structured around the concept of 'stacks' - each stack being able to contain innumerable linked cards of related information. Flipping between stacks of cards and sorting the data they contain is made possible through icon buttons which can be configured to perform functions ranging from simple diary and note creation to ingenious animation. In effect the only limit is your own imagination.

Although *Hyperpad* on the PC shares many of the same attributes as *Hypercard*, to the point where you might assume it's almost a clone, its not as flexible. But then the Mac's interface is far more advanced than the PCs.

• *Hypercard* on the Mac: possibly the most innovative piece of software to appear on the personal computer. This is a customised 'Home Card' - the centre of operations. Each of these icons buttons take you to different 'stacks' of interconnected cards.

THE STAR CHOICE

Can't afford a laser printer, but require quality print? The new Star XB-24 is the printer for you. Jerry Glenwright joins the dots...

Star XB24-15 ● £789 ● Star Micronics 01 840 1800

A printer is a vital addition to any computer system. There's not much point in writing the definitive novel if you can't print out a manuscript and send it to a publisher. And what about programmers? Wouldn't your endeavours be much easier if instead of squinting at the screen in attempt to find bugs in your program, you could peruse a printed copy of the routine on paper at your leisure?

Star's latest baby the XB24-15, is the Mercedes of the printer world. For little more than £800, you can have a 24 pin machine which has the wonderful ability to emulate 48 in printing. The greater the pin count in the dot matrix head, the better the quality of the resultant text and graphics the printer can produce. 48-pin machines have a quality of text production which rivals a laser printer. 24-pin machines are next in the quality hierarchy. Unfortunately, quality of print costs megabucks, and this is where the XB24-15 fills a gap. Quality printing at a price far below that of a 48-pin machine.

FEATURES. ● As well as the draft and letter quality printing modes offered by most printers currently on the market, the XB24-15 provides a 'super letter quality' mode which, in effect, allows the machine to behave as if it were a 48-pin printer. This feature is very easy to access with a simple press of the quality select button on the front panel and this is indicative of the general organisation of the machine – everything designed to be easy to use. DTP and graphics packages, word processing, spreadsheets, all will benefit greatly with the increase in print-out quality provided by 48-pin emulation mode.

To exploit the high resolution offered by the machine, there's a large selection of built-in typefaces; Courier, Prestige, Helvetica, Times Roman etc., all of which will help considerably with the finished appearance of your documents. As with the print mode selection, the typefaces can all be selected from the front panel via a font button.

There's friction and tractor paper feeding, as well as a cut sheet feeder as standard (essential for letters and other A4 documents) and an optional automatic sheet feeder.

Worried by the large amount of noise produced by a dot matrix printer? The XB24-15 has a 'quiet' button which, when pressed, considerably reduces the din level with only a slight reduction in print speed.

A 41K buffer is provided to free your computer whilst the printer is operation by storing a large quantity (if not all) if any text you send to the printer. If you tend to print large graphics or DTP files and 41K is enough, then you can buy add-on IC cards which increase the RAM in the buffer to 73K.

And for those of you who require colour to enhance presentation graphics, charts, DTP etc., there's an add-on colour device in the form of a

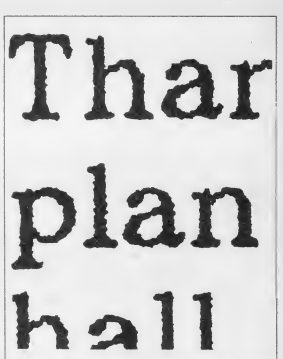
HIGHLIGHTS
- Fast
- Large print buffer
- 48-pin emulation

DRAWBACKS.
- A little expensive for the average home user

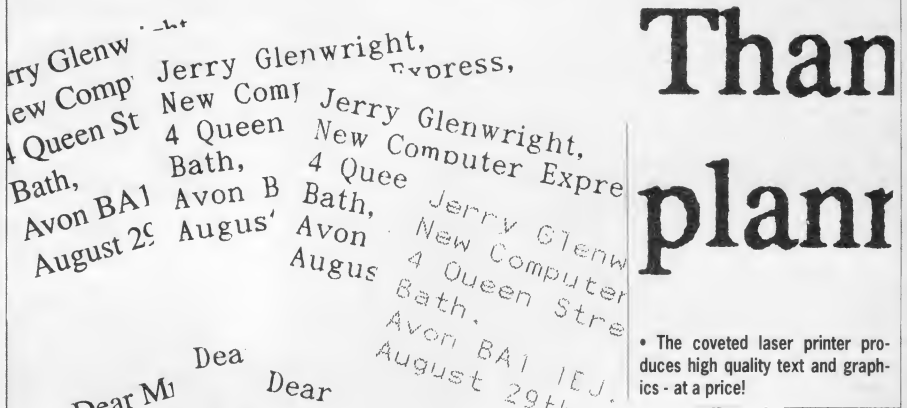
• At £789, the Star XB24-15 has to be the first choice for computer users such as freelance designers, journalists, newsletter producers etc., who need quality print but have limited budget...

• The same letter in draft. Text is still clear but obviously emanating from a dot matrix printer...

• Standard 24-pin mode. Text is clearly legible but of siginificantly poorer quality than 48-pin mode



• In 48-pin emulation mode, the XB24-15 produces print quality which rivals a laser



• The coveted laser printer produces high quality text and graphics - at a price!

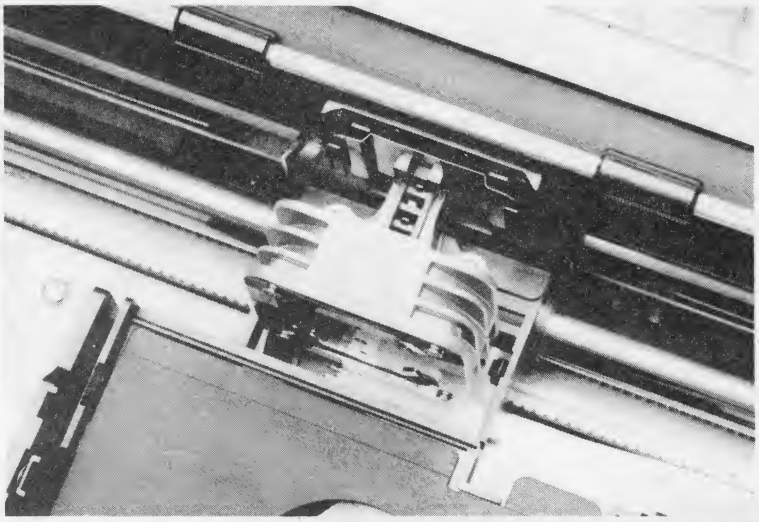
cartridge which fits into the print head which allows the machine to print in 7 colours black, red, blue, violet, yellow, orange and green. The cartridge is easily fitted by even the technically incompetent, costs £39.50 and is readily available from Star dealers. To complete the colour upgrade, you'll need to buy a colour ribbon for £12.50.

USER INTERFACE. ● Connecting the printer to your computer couldn't be more simple. Take it out of the box, plug in the mains cable, a Centronics printer lead between the printer and your machine, and switch on. The XB24-15 has a Centronics parallel interface as standard and an RS-232 interface as an optional addition, so it will connect to STs, Amigas, PCWs etc., with ease. Almost all the printer's functions can be selected from the bank of switches located on the front panel of the machine. Obviously, your software must be able to take advantage of the power of 48-pin and 24-pin printing by providing drivers but if not, then you should be able to obtain suitable drivers from the public domain for the majority of computers.

DOCUMENTATION. ● The manual is clear, lucid, and concise. The first thing to note is that it's spiral bound – you can have it lying open on your lap whilst tinkering with the printer. It begins with an overview of each chapter allowing you to locate specific information quickly. Descriptions of the control code sequences should be easily understood by all but the most hardened computer illiterates.

VERDICT ★★★★

An excellent printer. For those of you who need high quality reproduction but can't afford a laser or 48-pin printer, the XB24-15 is the perfect solution. It's fast, quiet, full-featured and simple to use. Highly recommended.●



• The business end of the XB24-15. The print head contains 24 tiny pins which, when fired in sequence produce text and graphics. 48 pin printing is achieved by a method known as overprinting i.e. printing text once, moving the head slightly, then printing again. In this way, characters are emphasised and emboldened. The hopper for standard ribbon cartridges an be clearly seen behind the head

THE OPPOSITION

The Star XB24-15 is a quality printer, but what's available from Star's rivals Citizen, Panasonic et al?

• **Citizen Swift 24.** A very reasonable £389 will buy you the Swift 24 featuring printing speeds of 192cps draft and 62cps letter quality, a large amount of built-in fonts and innovative paper handling. There's a parallel Centronics interface as standard but only 8K of RAM in the print buffer. Still, at this price, the printer is worth a second look for those working to a budget. Call Citizen on 01 388 9871.

• **Panasonic 1540.** A 24-pin printer from Panasonic which offers draft printing at 240cps, letter quality at 80cps, rear, bottom and front paper loading and an optional cut sheet feeder for A4 paper. Print buffer has 13.5K of RAM as standard and you can increase the size of this with a 32K ram card. The 1540 costs £665. Call Panasonic on 0344 853915.

• **Epson LQ1050.** The Epson printer is very expensive at £849. The printer offers a draft printing speed of 266cps, 88cps letter quality, has friction paper feed and a print buffer of only 6K – which can't be upgraded. Contact Epson on 0442 61144.

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ABSOLUTE BEGINNERS

In part 1 of a new weekly beginner's guide to computing, Rod Lawton looks at what computers are, what they do, and whether we really need them at all...

Who actually needs computers? What can they do? How much do they cost? How long does it take to learn to use one? Will I be "left behind" without one? Will they take over the world?

Those are just a few of the questions uppermost in the minds of those teetering on the brink of buying a computer.

Well, few people actually need computers, but they can make office routine and everyday chores easier than you might ever have imagined possible. They can also educate you, entertain you, and introduce you to a whole new – and fascinating – area of technology.

There was a time when you could expect to have to spend weeks or even months pouring over a computer and open manual before you could get the blessed machine to perform the simplest task. These days though, computers have advanced to the point where – paradoxically – you need to know next to nothing. If you can follow a set of instructions displayed on a screen, you can use a computer.

A good quality, versatile home computer set-up will cost you as little as £500. With that you can play games, write novels, and even launch a small business.

When home computers first hit the market, all the pundits predicted that unless you could write your own programs and – almost – build your own computers out of transistors, printed circuit boards and silicon chips, you would become a kind of technologically illiterate social dropout. Fears like that seem ridiculous now. The only way you can get "left behind" now is if you refuse to go near a computer because you still think they're malevolent superior intelligences that you need a degree in electrical engineering to understand. They're not, and you don't.

As for computers taking over the world, you're a bit late – they already have.

A blank page

Computers are actually completely devoid of any intelligence whatsoever. Unless they're specifically told to do something, they are completely inert, senseless objects. To actually carry out even the simplest task, a computer needs a detailed, explicit list of instructions – in other words, a "program". The programs are the "intelligent" part of the equation, and they're produced by entirely human operators. There's no more chance of computers seizing power of their own accord than there is of your car deciding to start itself up one morning and go off to work without you.

Soft sell

Computer programs are also known as "software" (as opposed to the computer, which is "hardware"), and most computers can carry out a wide variety of functions according to the software that has been produced for them. When you talk about a "word processor" you are discussing a program – or software – rather than the computer it runs on. It's the software you can get for it that actually governs what your computer can do and how useful it's going to be.

What's it do then guv?

▪ **THE WRITTEN WORD.** One of the most popular uses for home computers these days is for word processing. This might conjour up images solely of nimble-fingered secretaries bashing out company reports at 120 words per minute, but in fact word processors are useful for anyone who ever has to write a letter to the gas board, an essay for a school project or an article for *The Times*. Imagine a typewriter where you can go back and put right your mistakes, where you can move whole paragraphs to a new position in the text if you change your mind later, where the finished sheets aren't actually rattled out until you've got everything just how you want it. Many word processors these days will even check your spelling for you!

▪ **ALL ACCOUNTED FOR.** Owners of small businesses can find their lives made a great deal easier with a computer. Programs known as "spreadsheets" can perform very complicated calculations in an instant to let you know how even subtle changes in things like interest rates, foreign exchange rates and price fluctuations can affect your firm's profitability for months to come.

▪ **INFORMATION AT YOUR FINGERTIPS.** Programs called "databases" can store large numbers of records for just about any purpose. They work like huge card indexes, but whereas it might take you half an hour to find the card your looking for, the computer can locate the information in fractions of a second. Cross-referencing might take your secretary 10 minutes; a computer could do it at the press of a key.

▪ **THE GAMES PEOPLE PLAY.** Home computers are perhaps most famous (or is that infamous) for computer games, where one's beloved offspring sneak upstairs for hours on end to indulge in orgies of noisy alien-blasting instead of doing their homework. Your only consolation is that it's cheaper than going down to the amusement arcades.

And there's no denying the fact that computer games are fun. There is an enormous range to choose from these days, from the aforementioned space-borne bloodbaths to much more intellectual pursuits such as chess, backgammon and bridge. Wargame fanatics will find computers perfectly suited to the complex troop movements, rules of engagement and scoring systems involved, too, while a whole new genre of puzzle-solving "adventure" games has sprung up to use the computer's unique talents. Budding airline pilots, too, can place themselves at the controls of their favourite aircraft, thanks to flight-simulator programs that offer ever-increasing realism and involvement.●

SPOILT FOR CHOICE

Why are there so many different computers on the market? Which is the best one? What should I look out for?

Well there are so many different computers on the market simply because different manufacturers hit upon different solutions. Hi-fi buffs have a choice of CDs, conventional records and cassette tapes, photographers can choose between disc cameras, Instamatics and Hasselblads, car buyers can go for a Skoda or a Rolls – and so on. While most computers can do most jobs, some are better at specific ones. We'll be looking at the best computer for you in another installment of Absolute Beginners.

ME NO SAVVY

One by-product of the increasing sophistication of computer technology is that computers are actually getting easier to use. "User interface" is a fancy term to describe that part of a computer program where you go about telling the computer what you want it to do, and then makes sense of the answers it gives you. The way we like to provide information is actually very inefficient as far as a computer is concerned, and it takes it that much longer to translate our information into a form it can use. In the early days you really did have to be able to "talk the machine's language", since computers then were crude and limited. Now, computers are powerful enough to understand us, and to talk our language.

KEY FACTOR

One thing that most people will find a help if using a computer for the first time is some degree of keyboard skill. Those who've used typewriters have a head start, since computer keyboards are laid out in exactly the same fashion – no seconds wasted hunting for keys.

One use for computers is in fact to learn to type properly. You can buy typing tutors which train you in 'head up' typing by flashing words on the screen which you then have to duplicate on the keyboard. If you make a mistake the computer logs it and concentrates on the parts you find difficult.

IN BRIEF

• Computers are easy to use – and getting easier
• For the price of a 26-inch TV you can buy a complete home computer system
• Computers can help you write letters, plan your business, organise your payroll – and even relax you with a game or two (or two dozen) at the end of the day
• Computers are far from intelligent. In fact they're extremely stupid – they're just good at following instructions (i.e. programs)
• Different computers have different strengths – price, sound quality, graphics resolution, amount of software available. All computers are not the same by any means.
• Like any machine, you can spend as much or as little as you like. Beware of hidden extras you need before the computer will work properly, like monitors or second drives.

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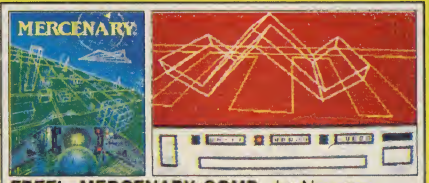

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PPING *EXPRESS* **SHOPPING**

50 TOP PCs

When it comes to choosing a computer to run serious software – databases, wordprocessors and the rest – you can't go far wrong with a PC compatible. The problem is, which one? There are literally hundreds of IBM clones around with incomprehensible specs and hugely ranging prices. To help make your choice easier, Shopping Express presents its guide to 50 of the top options...

Looking for a PC? Let *Express* help you make the right choice. Here's a definitive list of the top 50 PCs on the market with the vital details on each.

Each PC is listed alphabetically, with the manufacturer's phone number and the recommended retail price. It is often possible to get a better deal than this, especially by mail order – check out the advertisements in this issue.

Below the price is the technical specification of that computer; which microprocessor it has, how much memory, what kind of graphics display it uses, which disk drive, what input and output ports it's supplied with and any extras the manufacturer throws in.

POWER RATING

We've worked out a power rating for each machine. Does it pack the punch you need? Anything under 50 is fine for most uses – word processing, running a club or small business, playing the odd game – while if you're after power computing you'll need a machine round the 100 mark. It's only a rough guide, of course, and only has a meaning relative to the other ratings. Check the tech specs to see if it'll do the specific things you need.

For the curious, here's how we worked out the power ratings: 386: 30 points, 286: 20 points, V20/40: 15 points, 86: 10 points, 88: 5 points, serial ports 2 points each, parallel ports 2 points each, expansion slots 2 points each, 2.5Mb: 25 points, 2Mb: 20 points, 1Mb: 10 points, 640: 8 points, 512: 5 points, hard drive: 15 points, 3.5: 10 points, 5.25: 5 points points, VGA: 20 points, EGA: 10 points, CGA: 5 points.

DESIRABILITY RATING

There's also a desirability rating out of 100 – although the power rating is the most important, this indicates essentially 'how good' the machine is. This takes into account intangibles such as build quality and appearance as well as the perceived 'slickness' of the machine. Anything with single figures you'd be happy to get for Christmas but wouldn't walk down the road to buy. 30s and 40s would be worth a trip out of town to get. Anything over 90 and you'd sell your house and all its contents to buy one.

VALUE FOR MONEY

Finally there is the value for money rating. Measured out of five, the star rating indicates just how much computer you get for your pound.

● AMSTRAD PC1640

£499 • 0277 228888 • 8086 CPU (4.77/8MHz) • 640K RAM • CGA • 1 parallel port • 1 serial port • 3 expansion slots • 5.25 floppy • GEM, mouse and bundled software

Bottom of the - usable - range Amstrad PC. Plastic case of flimsy construction containing only three expansion slots and supporting a poor quality monitor which also houses the power supply (making it next to impossible to upgrade a mono system to colour). The package includes the GEM graphic operating system as well as MS-DOS and a mouse. Enjoys the somewhat ambiguous distinction of being cheap.

Power: 38
Desirability: 15

VALUE FOR MONEY: ★★★

● AMSTRAD PC2286

£999 • 0277 228888 • 80286 CPU • 1Mb RAM • VGA • 1 parallel port • 1 serial port • 5 expansion slots • 40 Mb hard drive • mouse and bundled software

The Amstrad stab at high tech. Good quality VGA display let down by plastic machine with enormous footprint and slow hard drive. The machine is at least supplied with a reasonable - if not generous - supply of expansion slots.

Power: 79
Desirability: 50

VALUE FOR MONEY: ★★★

● APRICOT XEN-S PC

£1495 • 021 456 1234 • 386SX CPU • 1Mb RAM • VGA • 1 parallel port • 2 serial ports • 3 expansion slots • 30Mb hard drive

Well-known for attempts at providing powerful computers, the XEN-S PC is Apricot's mid-range 386 machine. Reasonable construction, moderate keyboard but expensive.

Power: 87
Desirability: 60

VALUE FOR MONEY: ★★

● ARC PT88-1

£ 810 • 01 684 1948 • 8088 CPU • 640K RAM •CGA • 1 parallel port • 2 serial ports • 4 expansion slots • 5.25 floppy • paper white monitor

Arc's bottom of range computer. A well made machine which, although expensive, comes with 4 expansion slots and a paper white monitor.

Power: 37
Desirability: 20

VALUE FOR MONEY: ★★

● ARC PT 88-2

£ 1,140 • 01 684 1948 • 8088 CPU • 640K RAM • CGA • 1 parallel port • 2 serial ports • 4 expansion slots • 20Mb hard drive • paper white monitor

One of a large range of PC compatibles from ARC, the PT88-2 is a well made computer which suffers from being a little expensive.

Power: 47
Desirability: 30

VALUE FOR MONEY: ★★

● ARC T304

£ 3,650 • 01 684 1948 • 80386 CPU • 2Mb RAM • VGA • 1 parallel port • 2 serial ports • 8 expansion slots • 40Mb hard drive (and twin floppies) • paper white monitor

Starter computer for Arc's top the range machines, the T304 with 386 central processor, 40Mb hard drive and paper white monitor is an excellent machine.

Power: 107
Desirability: 85

VALUE FOR MONEY: ★★★★

● ATARI PC3

£949.99 • 01 309 7770 • 8088 CPU • 640K RAM • EGA • 1 parallel port • 1 serial port • 4 expansion slots • 30Mb hard drive • mouse

Atari's foray into the PC compatible market opens with the PC3. Cheap, well made useable machine which commands consideration from anyone searching for a first PC with hard drive on a limited budget.

Power: 50
Desirability: 45

VALUE FOR MONEY: ★★★

● ATARI PC5

£2,799.99 • 01 309 7770 • 80386 CPU • 2Mb RAM • VGA • 1 parallel port • 1 serial port • 5 expansion slots • 60Mb hard drive (with high performance controller card) • 1.2Mb floppy

The last word in PC power from Atari, the PC5 is aimed fairly and squarely at the 'power user'. Superior specifications and a very reasonable price ensures its success in the high-end market place.

Power: 99
Desirability: 75

VALUE FOR MONEY: ★★★★

● BROTHER BC10

£780 • 061 330 6531 • 8088 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 4 expansion slots • 20Mb hard drive

Better known for quality printers, Brother's BC10 PC is an attempt to conquer the compatible market. Reasonable specifications and quality construction coupled with aggressive pricing gives the machine a head start in the marketplace.

Power: 45
Desirability: 38

VALUE FOR MONEY: ★★★

● COMMODORE PC10

£ 549 • 0628 770088 • 8088 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 3 expansion slots • 5.25 floppy

Entry level PC compatible from home computer manufacturer Commodore. Well made, good keyboard but a little expensive.

Power: 33
Desirability: 20

VALUE FOR MONEY: ★★★★

PC TO TV AND VIDEO IN CGA AND EGA

Vine Micros can supply a large range of PC-TV Adaptors which allow the connection of PCs to standatd TVs, Videos and Monitors. Both CGA and EGA versions are available - the latter being able to support 640 x 350 line modes (only 280 lines viewable at any one time) with a full 64 colour pallette. Our UHF Adpators (not suitable for PC1512) connect to both a TV, throught its aerial socket and to a video recorder. The SCART Adaptor is only for TVs with a suitable connector but does give a near monitor quality. Other adaptors include a monochrome composite video version, a digital version for connection of BBC micro or Amstrad CPC colour monitors and a device to allow the Amstrad PC1512 to use a standard monitor.

CGA UHF	**£44.95**	**CGA SCART**	**£34.95**
EGA UHF	**£59.95**	**EGA SCART**	**£39.95**
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Monochrome CV	£29.95		

All adaptors (except PC1512 monitor adaptor) require seperate 12v mains adaptor £5.75.
All Prices exclude VAT - carriage free in mainland UK

EGA Genlock Video Adaptor
Vine Micros latest product is the EGA Genlock Adaptor - this allows overlaying of computer text/graphics on TV, Video recorder and camera displays. The adaptor will be demonstrated at the Personal Computer Show (Stand 2438). Available Oct/Nov RRP approx £120.

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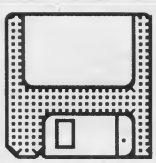

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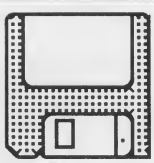

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● COMMODORE PC 60-80

£ 2,999 • 0628 770088 • 80386 CPU • 2.5Mb RAM • VGA • 2 parallel ports • 2 serial ports • 8 expansion slots • 80Mb hard drive •
Power computing for the people! The PC60-80 is one of the most powerful of the affordable 386 machines on the market. The computer is thoughtfully designed, well made and at this price, sports unbelievable power potential.

Power: 114
Desirability: 95

VALUE FOR MONEY: ★★★★

● COMPAQ DESKPRO 286

£1,495 • 01 332 3000 • 80286 CPU • 640K RAM • VGA • 1 parallel port • 1 serial port • 7 expansion slots • 20Mb hard drive • 1.2Mb floppy
Renowned for quality, powerful - if expensive - computers, the DeskPro 286 carries on the tradition or Compaq.

Power: 66
Desirability: 55

VALUE FOR MONEY: ★★★

● COMPAQ DESKPRO 386

£2,195 • 01 332 3000 • 80386 CPU (20MHz) • 1Mb RAM • VGA • 1 parallel port • 1 serial port • 7 expansion slots • 20Mb hard drive • 1.2Mb floppy
Compaq's top the range power computer. Highly desirable machine featuring a 20MHz 386 central processor, clean construction, good keyboard etc.

Power: 83
Desirable 80

VALUE FOR MONEY: ★★★

● DELL SYSTEM 325

£ 5,699 • 0800 414535 • 80386 CPU • 1Mb RAM • VGA • 1 parallel port • 2 serial ports • no expansion slots • 320Mb hard drive
Dell is generally regarded as being the power computer manufacturer and the System 325 machine does nothing to dispel the fact. Powerful and with an enormous disk drive. A desire for power and bulging coffers are the necessary qualifications for this machine.

Power: 81
Desirability: 90

Value for money ★★★

● DOLAN XT

£599 • 026784 538 • 8088 CPU • 640K • Hercules • 2 serial ports • 2 parallel ports • 8 expansion slots • 40Mb hard drive • Bundled software.
Cheap entry-level XT from Dolan. Very good value for money, with a paper white monitor and fast hard drive. Recommended.

Power: 60
Desirability: 60

VALUE FOR MONEY: ★★★★★

● DOLAN AT

£1,025 • 026784 538 • 80286 CPU • 1Mb RAM • EGA • 2 serial ports • 1 parallel port • 5 expansion slots • 45Mb hard drive • mouse, bundled software
Top of range Dolan AT which includes a fast hard drive, Microsoft mouse and Windows in the low price.

Power: 65
Desirability: 70

VALUE FOR MONEY: ★★★★

● ELONEX PC 88-C

£695 • 01 965 3225 • V20 • 640K RAM • CGA • 1 parallel port • 1 serial port • 2 expansion slots • 20Mb hard drive • GEM, mouse
Budget computer manufacturer. The PC-88C is Elonex's entry level machine. Sporting a fast V20 processor and 20Mb hard drive for a miniscule 700 quid the machine deserves a place at the top of any budget PC shopping list. Well made and reliable.

Power: 51
Desirability: 40

VALUE FOR MONEY: ★★★★

● ELONEX PC286S-120

£1,495 • 01 965 3225 • 80286 CPU (12MHz) • 640K RAM • CGA • 1 parallel port • 2 serial ports • 3 expansion slots • 40Mb hard drive • GEM, mouse
Mid-range Elonex compatible featuring 40Mb hard drive and a small footprint.

Power: 58
Desirability: 40

VALUE FOR MONEY: ★★★★

● ELONEX PC 382S-200

£3,095 • 01 965 3225 • 80386 CPU • 1MB RAM • VGA • 1 parallel port • 2 serial ports • 3 expansion slots • 320Mb hard drive • GEM, mouse
The top of range Elonex computer sporting a 320Mb hard drive and VGA graphics adaptor at an affordable price.

Power: 87
Desirability: 75

VALUE FOR MONEY: ★★★

● EPSON PCE HD

£1,199 • 0442 61144 • 8088 CPU • 640K • CGA • 1 parallel port • 1 serial port • 3 expansion slots • 20Mb hard drive
Epson provided the industry standard for 9-pin printers and control codes but is not going to set any standards with the PCe. Expensive and underpowered - it's a dodo.

Power: 33
Desirability: 0

VALUE FOR MONEY: No stars

● EPSON AX FD

£1,599 • 0442 61144 • 80286 CPU • 640K • CGA • 1 parallel port • 1 serial port • 7 expansion slots • 5.25 floppy
Mid-range Epson 286-based PC. Incredibly overpriced.

Power: 51
Desirability: 2

VALUE FOR MONEY: ★

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APRICOT					
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XEN-S250	47MB	1MB	16	2100	2300
XENi-1286/30	30MB	1MB	16	1499	2050
XENi-1386/50	47MB	2MB	16	2775	2985
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OPUS			
PC3 DD		1MB	10
PC3 HD	30MB	1MB	10
PC4 286	20MB	1MB	12
PC5 286	30MB	1MB	10
PC5 286	40MB	1MB	10
PC5 386	40MB	1MB	20
PC6 286	60MB	1MB	12
PC7 386	70MB	4MB	20

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TANDON		
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PCA1.2 PLUS	IMB	10
PCA/12 SL20	640K	12
PCA/12SL40	640K	12
386/16 40	IMB	16
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ZENITH				
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PC4641	40MB	640K	10MHZ	1639
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	CPU	DISK	RAM	
TOSHIBA				
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T1200 HB	8086	20MB	1MB	1790
T1600	80286	20MB	1MB	PLEASE CALL
T3100E	80286	20MB	640K	1995
T3200	80286	40MB	1MB	PLEASE CALL
T5100	80386	40MB	2MB	3290
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	DISK	RAM	MHZ	
ZENITH				
SUPERSPORT	DD	640	8MHZ	919
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SUPERSPORT 286	20MB	1MB	12MHZ	1999
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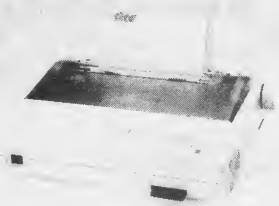

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● EPSON AX80 HD

£2,499 (excl. monitor) • 0442 61144 • 80286 CPU • 640K • CGA • 1 parallel port • 1 serial port • 6 expansion slots • 80Mb hard drive

Ridiculously overpriced top of range computer from Epson. Price does not include a monitor (!).

Power: 64
Desirability: 0

VALUE FOR MONEY: ★

● IBM PS/2 30

£1,298 • 01 747 0747 • 8086 CPU • 640K RAM •EGA • 1 parallel port • 1 serial port • 3 expansion slots • 3.5 floppy

IBM's starter machine. Very well made, reliable and with the backing of Big Blue. Not cheap, but then the best always costs a little more, right?

Power: 48
Desirability: 75

VALUE FOR MONEY: ★★

● IBM PS/2 50

£2,389 • 01 747 0747 • 80286 CPU • 1MB RAM • VGA • 1 parallel port • 1 serial port • 3 expansion slots • 20Mb hard drive

From the company that started it all, the mid-range computer. All the superlatives associated with the model 30 and 10 times the desirability.

Power: 65
Desirability: 95

VALUE FOR MONEY: ★★

● IBM PS/2 80

£4,407 (from) • 01 747 0747 • 80386 CPU • 2MB RAM • VGA • 1 parallel port • 1 serial port • 7 expansion slots • 44-314Mb hard drive • 1.2 Mb floppy • floor standing

The computer from *the* computer company.

Power: 103
Desirability: 100

VALUE FOR MONEY: ★★

● NEC POWERMATE 1

£1,395 • 01 993 8111 • 80286 CPU • 640K RAM • VGA • 1 serial • 1 parallel • 6 expansion slots • 20Mb hard drive

NEC's entry level computer. Fast but expensive.

Power: 59
Desirability: 50

VALUE FOR MONEY: ★★★

● NEC POWERMATE 386 20

£5,895 (excl. monitor) • 01 993 8111 • 80386 CPU • 2Mb RAM • VGA 2 serial ports • 1 parallel port • 8 expansion slots • 300Mb hard drive

Top of range NEC 386-based machine. Vast power but an expensive buy.

Power: 95
Desirability: 65

VALUE FOR MONEY: ★★

● NESS AT-286 S

£1,195 • 01 806 1072 • 80286 CPU • 512K RAM • CGA • 2 parallel ports • 1 serial port • 5 expansion slots • 20Mb hard drive

Mid-range PC compatible notable only for its non-conformist specifications!

Power: 61
Desirability: 30

VALUE FOR MONEY: ★★

● OPUS PCIII SF TURBO

£549 • 0733 765080 • 8088 CPU • 256K RAM • CGA • 1 parallel port • 1 serial port • 7 expansion slots • 5.25 floppy

The UK's second largest PC compatible manufacturer (Amstrad being the first) Opus have a fine reputation for quality machines. The PCIII is ideal for use as a LAN terminal.

Power: 34
Desirability: 30

VALUE FOR MONEY: ★

● OPUS PCIV TURBO

£995 • 0733 765080 • 80C88 CPU • 768K RAM • CGA • 1 parallel port • 1 serial port • 2 expansion slots • 20Mb hard drive

Mid-range Opus machine which is reasonably priced but lacking in expansion options.

Power: 41
Desirability: 40

VALUE FOR MONEY: ★★

● OPUS PCVI TURBO

£1,295 (from) • 0733 765080 • 80286 CPU • 1Mb RAM • VGA • 1 parallel port • 1 serial port • 5 expansion slots • 60Mb hard drive • mouse port

Top of range computer from Opus featuring good specifications and a reasonable price.

Power: 79
Desirability: 65

VALUE FOR MONEY: ★★

● PHILIPS NMS 9115

£799 • 01 689 2166 • 8088 CPU • 640K RAM • EGA • 1 parallel port • 1 serial port • 4 expansion slots • 20Mb hard drive

Philips is a company with a deservedly good reputation in the consumer electronics market place for good quality, reliable and well made equipment. The NMS 9115 is the mid-range PC compatible from the company, offering decent specifications and a moderate price, the machine is worth more than a cursory glance.

Power: 50
Desirability: 45

VALUE FOR MONEY:•••

● PHILIPS PC FAX 2

£1,049 • 01 689 2166 • 8088 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 4 expansion slots • 20Mb hard drive • internal FAX card

The Philips PC Fax-2 offers the unusual add-on of a FAX card included in the

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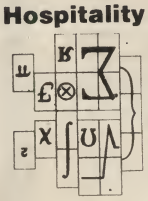

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Power: 50
Desirability: 60

VALUE FOR MONEY: ★

● RSC 386T 20

£2,229 (from) • 0923 243301 • 80386 CPU • 2Mb RAM • EGA • 1 parallel port • 2 serial port • 8 expansion slots • 40-122Mb hard drive

Top of range 386 computer from relative newcomer RSC. Thoughtful design and quality construction guarantee the machine a share of the market.

Power: 97
Desirability: 75

VALUE FOR MONEY: ★★★

● SAMSUNG SPC 3000/2

£699 • 01 391 0168 • 8088 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 7 expansion slots • 5.25 floppy

Entry-level PC compatible from Korean computer manufacturer Samsung. The SPC3000 offers a good range of expansion options, quality construction and reliability.

Power: 41
Desirability: 50

VALUE FOR MONEY: ★★

● SAMSUNG MFC 6000/2

£1,499 • 01 391 0168 • 80286 CPU • 1MB RAM • EGA • 1 parallel port • 1 serial port • 6 expansion slots • 20Mb hard drive • 1.2Mb floppy

Samsung's attempt at attracting the power user, the MFC6000 computer is powerful and like all Samsung computers, well made and reliable.

Power: 45
Desirability: 47

VALUE FOR MONEY: ★★★

● SCHNEIDER EURO PC

£458.85 • 0604 766572 • 8088 CPU • 512K RAM • CGA • 1 parallel port • 1 serial port • 1 expansion slot • 3.5 floppy • bundled software

Entry-level PC compatible which breaks with the traditional '3 box' style of PC design and instead, includes motherboard and drive in the keyboard (similar to Atari ST and Commodore Amiga) - fine but where do you put expansion cards? There is one expansion port at the rear of the computer the use of which entails having your add-on hanging free at the exposed rear. Definitely for those with severely limited budgets (for another £50 you can have the Amstrad PC1640).

Power: 31
Desirability: 5

VALUE FOR MONEY: no stars

● SCHNEIDER TOWER AT

£799 (from) • 0604 766572 • 80286 CPU • 512K • EGA • 1 serial port • 1 parallel port •5 expansion slots • 20Mb hard drive • bundled software

The exact opposite of Schneider's other computer the Euro PC, the Tower AT is aimed at the power user with money to burn. however the machine offers reasonable specifications at a very moderate price and as such deserves your attention.

Power: 50
Desirability: 45

VALUE FOR MONEY: ★★★

● TANDON PCX20

£1045 • 0572 46800 • 80C88 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 5 expansion slots • 20Mb hard drive

Tandon is a computer manufacturer responsible for a large range of PC and AT compatibles. The PCX 20 is an entry level computer which is robust and fully featured - worthy of close examination for those looking for a first PC.

Power: 47
Desirability: 50

VALUE FOR MONEY: ★★★

● TANDON PAC286 1.2 PLUS

£1,688 • 0572 46800 • 80286 CPU • 1Mb RAM • DISPLAY • 1 parallel port • 1 serial port • 3 expansion slots • 20Mb hard drive • 1.2Mb floppy

Mid-range 286-based AT compatible from Tandon featuring a high density floppy drive as standard. A little expensive.

Power: 65
Desirability: 55

VALUE FOR MONEY: ★★

● TANDON 382/20 110

£3,399 • 0572 46800 • 80386 CPU • 1Mb RAM • VGA • 1 parallel port • 1 serial port • 5 expansion slots • 110Mb hard drive • Microsoft windows

Top of range Tandon 386 featuring large capacity 110 megabyte hard drive, robust construction and reliability. This machine has everything you could ask of a PC compatible machine and has a price to match.

Power: 79
Desirability: 65

VALUE FOR MONEY: ★★★

● TANDY 1000SL

£695 (from) • 0922 710000 • 8086 CPU • 384K RAM • CGA • 1 parallel port • 1 serial port • 5 expansion slots • 20Mb hard drive

Tandy (AKA Radio Shack in the States) is a company with a large amount of experience in the electronics industry. Tandy has numerous outlets around the country and the person-power to cope with warranty repairs etc., consequently Tandy PC compatibles are a surprisingly good buy if a little expensive. The 1000SL is an unusual looking entry level computer which suffers from a small RAM to large price ratio.

Power: 44
Desirability: 20

VALUE FOR MONEY: ★★★

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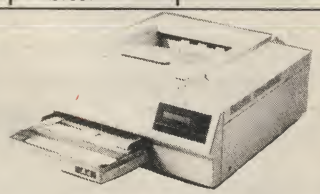

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Fully-featured 386 computer from Tandy. High constructional quality and plenty of expansion possibilities ensure the 50000MC a rosy future.

Power: 99
Desirability: 75

VALUE FOR MONEY: ★★

● VICTOR VPC11C

£1,099 (from) • 0494 461600 • 8086 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 3 expansion slots • 30-60Mb hard drive

No-frills PC compatible from relative newcomer Victor. The machine is well made, has a super keyboard and crisp display. A little expensive at £1100.

Power: 48
Desirability: 35

VALUE FOR MONEY: ★★★

● VICTOR V286S

£2,499 • 0494 461600 • 80286 CPU • 1Mb hard drive • CGA • 1 parallel port • 1 serial port • 8 expansion slots • 40-130Mb hard drive

The V286S is the mid-range machine of the six machines currently marketed by Victor. Rather expensive, but of stout construction and reliable.

Power: 70
Desirability: 60

VALUE FOR MONEY: ★★

● VICTOR V386S

£3,999 • 0494 461600 • 80386 CPU • 2Mb RAM • VGA• 1 parallel port • 1 serial port • 8 expansion slots • 130Mb hard drive

Top of range 386-based computer from Victor. Expensive.

Power: 95
Desirability: 70

VALUE FOR MONEY: ★★★★

● VIGLEN VIG1

£789 • 01 843 9903 • V20 CPU • 640K RAM • CGA • 1 parallel port • 1 serial port • 5 expansion slots • 30Mb hard drive

The VIG 1 is an imaginatively titled entry-level computer from Viglen. Fully-featured and cheap, the machine deserves a second look.

Power: 57
Desirability: 50

VALUE FOR MONEY: ★★

● VIGLEN VIG1 PLUS

£1,189 • 01 843 9903 • 80286 CPU • 640K RAM • VGA • 1 parallel port • 1 serial port • 5 expansion slots • 30Mb hard drive

Mid-range 286 machine from Viglen labouring under the unfortunate name of the VIG 1 (sounds rather like a Gerry and Sylvia Anderson creation) which nonetheless an excellent and cheap computer worthy of your attention.

Power: 77
Desirability: 70

VALUE FOR MONEY: ★★

● ZENITH EASY PC

£499 • 06286 68588 • V40 CPU • 512K RAM • CGA • 1 parallel port • 1 serial port • no expansion slots • 3.5 floppy

Appalling trash computer from Zenith.

Power: 29
Desirability: 0

VALUE FOR MONEY: no stars

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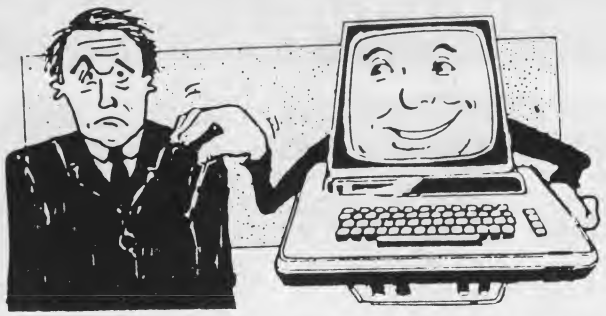

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PC UPDATE

Agent Animateur

Those awfully nice people at Autodesk have sent me a press pack on their *Animator* package, their first venture into 'the burgeoning desktop video market'. As the name suggests, the product is intended for making computer-based animations, though from the content of the press release I think it is intended more for the business presentation market than as a rival to Disney.

I hope to report further on the product. Autodesk were kind enough to enclose an hour long video and a disk-based VGA demonstration. I haven't the heart to tell them I only have EGA on my PC, and that I live in one of the half dozen houses in the country which doesn't contain a video player!

Timeworks extra time

Timeworks DTP is, in my view, the best mid-price DTP package for the PC. This doesn't mean it's faultless, of course, but it certainly has fewer faults than any of the other programs I've used. While it's not as all-embracing as *Ventura*, it contains the important elements of typography and layout that a desktop publisher needs.

Now there's version 1.2, or at least there should be by the time you read this. It's main advantages are extensions to existing features, rather than radical rewrites of the main code. Things like extra printer support, additional text file import (from *WordStar 5* among others) and further paper formats, including A3, A4 and A5. It will also allow the full range of *Typographica* fonts to be displayed in the font selector box and handle HP downloadable fonts for laser printers.

These are all very laudable extensions to the system, but what I want to know is whether the new version will have sorted out the problems I've recently had. Will it be able to print an A5 page in the centre of an A4 sheet, positioning crop marks at the A5 corners? It's possible to mark these out by hand, of course, but all X,Y measurements are still taken from the top left-hand corner of the A4 sheet. This type of page make-up is ideal for preparing print masters of any A5 publication which is going to be photo-lithographed.

A more minor problem is *Timeworks*' determination to change the spaces between words in unjustified lines of text. If you are producing a piece of flush-left text it's very disconcerting to have words split by unnecessarily large spaces. The only way currently to get around this problem is to tie the offending words together with a hard space (by pressing [Ctrl][Space]).

The upgrade to version 1.2 will cost £39.95, and you can claim a fiver back if you're a member of Softline. As an introductory offer, GST is also offering a free *Typographica* font of your choice. That really is a good deal - ring GST on (0480) 496660 for details of availability.

Protection racket

I recently had a graphics program called *Cameo Paint* through for review. It promised to be one of the first to take advantage of the 256 colours available in VGA mode, and was said to have been ported down from the Pluto graphics card. This was an add-on for the PC which was well received at its launch a few years back.

The program may well be very good, but at this stage I'm more interested in one of the other 'features' of the package. It installs as any other serious application does on the PC, by copying the appropriate files into a sub-directory of your hard disk. I did this, had spent some time playing around with the package, and was about to wipe it off my hard disk while having a 'clear-out'. I reasoned that as I had the masters there would be no problem.

Not a bit of it. If I'd wiped the CAMEO directory clean, I would have lost the program for good. It incorporates a protection scheme which requires the program to be deinstalled back to the master floppy before it can be moved to another hard disk, or reinstalled on the same one. There's no mention of a protection scheme on the packaging, and the only indication is a paragraph in the manual headed 'Uninstalling the software'.

This kind of thing makes me angry. With my user hat on I don't like copy-protection at the best of times, though in my supplier's hat it seems a necessary evil, given the state of piracy in the country. What I think is unforgivable is not making it completely clear to the user that the protection exists and that you need to take care to keep your investment intact! This should be printed in large letters, preferably on a seal across the disks.

Simon Williams

BASIC out of the nursery

There are a lot of people who poo-poo BASIC, more out of habit than logic. I've more recently written in Pascal, which imposes a structure that suits the way I write. I'd rather be told about my mistakes than have to find them out the hard way. For all that, modern BASICs have many of the structured features of Pascal and Modula 2, but with the flexibility of an interpreter. Most also include a compiler, of course.

A further feather in BASIC's cap is the recent adoption of QuickBASIC my Microsoft (its author) as the recommended language for applications programming under OS/2. Systems programming is still the province of C, but for the programs that give you all the fun benefits of the largest single user operating system on the market, QuickBASIC's the one - and that's official.

• Microsoft QuickBASIC: BASIC comes of age

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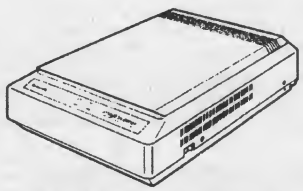

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ST into warp speed

Third Coast have been very active on the ST scene of late. Their latest product to hit the hardware add-on enthusiast is Hypercache – a speed-up board which can be fitted into any ST and claims to offer 70-100% speed increases.

Third Coast are importing the product from Germany where it's already a success. Hypercache uses a 16MHz 68000 processor which alone can deliver around a 20% speed increase. But it's the fast RAM cache which really makes it bomb along.

The Hypercache board has an 8K instruction cache running at 70ns. With several commands read into here, execution speeds of 16MHz are allowed for much longer periods than would be possible without the cache. As with an ordinary RAM disk, all the data being written to the main RAM is also sent to the cache where it can be processed quickly.

Sections of code can be executed within the cache at twice the speed but it's rare for programs to optimise on this. Internal calculations and short program loops can thus benefit best from the cache but for the majority of applications, a 50% speed increase is more realistic.

The board requires a couple of wires to be soldered onto several chips so it's best to refer fitting to your dealer. The RAM cache can be turned on and off by software control – either a desktop accessory provided or an XBIOS call. A hardware switch may also be added to disable the cache. Like this, only the 16MHz chip is used so you get a 20% increase.

A lot of games software will not run properly with Hypercache fitted but there are enormous benefits when using CAD or DTP packages where the extra speed is really noticed and for just £150 it's not out of reach for most people.

Third Coast Technologies can be contacted on 0257 426464.

Scan the man

The Kempston DAATAscan Handyscanner has been on the market for some time but although the scanner works perfectly, there have been a lot of complaints aimed at the software. In answer to the criticism, Kempston have just released *DAATAscan Plus*.

The whole package retails for £250 which includes scanner and new software. This offers two display windows – one provides a look at the whole page while the other is a work area normally displaying the scanned image at 100%.

To scan your image you first draw a box in the page window, indicating the area of the page that you wish the image to go into. This allows you to have several scans scattered all over the page. As the image is scanned the box in the page window is filled up with a reduced view of the image whilst a full-sized one fills the work window.

• ***DAATAScan's*** **improved image grabbing software**

The software then allows you to manipulate the image so that it may be edited pixel by pixel, areas can be cleared and the image may be saved to disk in a multitude of formats.

Extras to the original software include options usually only found in advanced paint packages. You can zoom into specific areas, increase or decrease the brightness of the image, rescale, rotate or print it. Cut and Paste options and a new fill feature are particularly useful.

Upgrades are available for £25. Kempston can be contacted on 0234 841224.

DAATAscan Plus has some powerful features so it no longer needs to be bundled with *Hyperpaint*.

East West conflict

On the games front this week, Mirrorsoft's new *Conflict Europe* has made a big impression on me. It's the 16-bit version of *Theatre Europe* which was released back in '85 and won the strategy game of the year award.

Conflict Europe is set in a not-too-distant future where East-West relations have disintegrated to such a degree that the NATO forces are at war with the Warsaw Pact. It's up to you to fight the war without resorting to nuclear attack but the battles invariably degenerate into a bout of nuking.

The war is fought on a large map where you can see your own and opposing armies. Friendly units can be moved around the map and can engage in battle if they come up against the opposition.

If things start getting tough and your units are obliterated with alarming regularity then you can move to the nuclear control panel and launch all sorts of different attacks. When these hit their target you switch to a different display in which you see cities go up in a mushroom cloud.

The trouble with launching a nuclear attack is that it can spark off retaliatory measures and in no time at all you've started a global nuclear war.

It doesn't have all the intricacies of Mirrorsoft's earlier release, *Waterloo*, and thus appeals to people who aren't necessarily wargame fanatics. It's great fun to play and very addictive. Catch the full review in issue 3 of our sister mag, *ST Format*.

Kim Harmargh

Old Neochrome

What's the oldest ST art package around? Neochrome of course. It's one of those packages which every ST owner owns but few know where it came from, least of all how it works properly. It's been hanging around on the public domain since 1986 when Atari bundled it with early STs. Since then it's got everywhere but very few people have got the manual so using it can be a headache.

I recently found an ASCII disk-based version supplied by The South West Software Library on PD disk 150 along with two copies of the program and several utilities. This manual only covers the early version so using the limited animation commands of the latest one is still a case of trial and error.

If you still haven't found out how to access animation then you must click the right mouse button over the 'R' in Grabber. Instantly an old camera appears.

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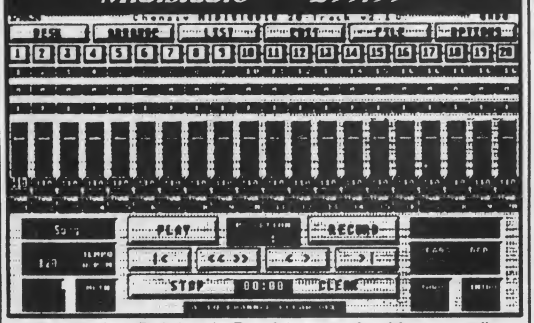

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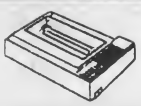

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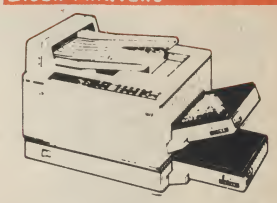

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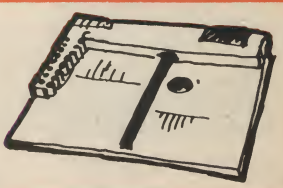

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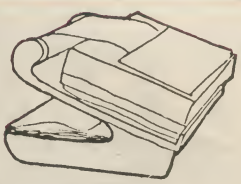

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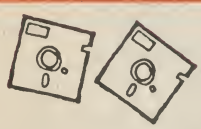

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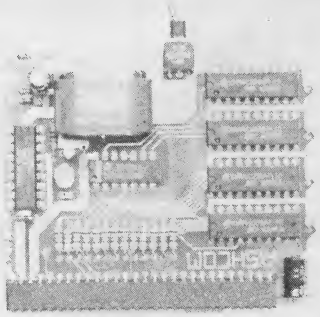

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AMIGA BLIT

CCS do it again!

They said it couldn't be done, but the impossible has been achieved – the Amiga can now read and write Macintosh disks directly thanks to the American software house Central Coast Software. CCS, who are probably better known as 'the people who produce the *DOS-2-DOS* utility', have finally cracked the problem and have released the follow up to *DOS-2-DOS*, the imaginatively named *MAC-2-DOS*.

MAC-2-DOS allows any standard Amiga to read and write floppy disks in Macintosh format. "So what?" I hear you say. Well, the most impressive thing about this achievement is that the Macintosh uses a special multi-speed drive mechanism which speeds up or slows down the drive motor in accordance to the disk head position. Previous attempts at achieving Macintosh disk compatibility have very much been restricted to reading only those tracks where the Mac drive spins the disk at the same speed as an Amiga drive (*A-Max* for example).

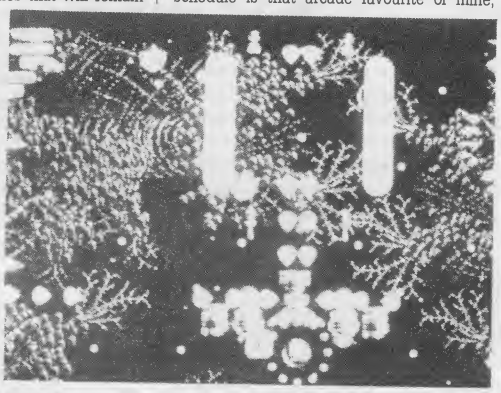
So far, no details concerning European distribution have been made available but is is more than a certainty that *MAC-2-DOS* will eventually make it to these shores.

Paperboy arrives

Elite certainly cannot be accused of rushing the release of a game, but when they finally are released, it is usually well worth the wait. Elite's latest is that long awaited arcade conversion of the Atari coin-op classic, *Paperboy*.

Unlike certain companies that will remain nameless (Canadian Silver?), Elite don't just port ST games across to the Amiga without modification. Anyone who has played the Amiga version of *Space Harrier* will confirm that the programmers at Elite certainly do know their business. Just like *Space Harrier, the Amiga version of Paperboy* uses a full overscan display and is almost coin-op perfect.

Overscan is one of the facilities of the Amiga hardware that is sadly very much unused in games software. Setting up an overscan display from the hardware level is very simple indeed and can enhance just about any game with little effort from the programmer – just try walking into your local arcade and you'll be hard pushed to find an arcade game that doesn't use an overscanned display. So come on Amiga games programmers – think overscan.



• *Xenon II* – not out until late September, but definitely worth the wait!

Cracking Cybernoid II

No, this isn't a lecture on tearing bytes limb from limb using your favourite disassembler, but a hidden cheat mode that was revealed to me by the person who should know about these things – the programmer of *Cybernoid II*, my old friend Tony Cooper.

Tony is currently hard at work keeping his bulletin board system up and running (0903 700771, 24 hrs, v21/22/22b/23) and working on his latest mega block buster game (which I'm not allowed to say a thing about or he'll send me a letter bomb in the post). However, Tony took timeout to tell me the definite cheat for his little masterpiece.

Enough wibbling, onto the tip. For infinite lives, try typing in 'NECRONOMICON' on the title screen for infinite lives. Incidentally, for those of who who are even remotely interested, the Necronomicon is the Book of the Dead.

Games update

l Those of you looking forward to getting your mitts on the Bitmap Brothers' latest megablast, *Xenon II*, are in for a shock. Imageworks do not plan on releasing either the ST or Amiga versions of the game until September 25th – possibly to coincide with this years PC Show at Olympia.

l Ocean certainly seem to be producing some real corkers just recently – what with *New Zealand Story* and *Robocop*, Amiga gamers have been having a pretty good time of it of late. Ocean's next release is based on that incredibly popular game of volleyball (OK, so I exaggerated a teensy weensy bit). *Beach Volley* was written in France and the game features the same cutesee, cartoon-like graphics we've come to expect from those Frenchies. The aim of the game is to travel around the world playing volleyball in countries ranging from Egypt to Great Britain. *Beach Volley* will be available in late August for the usual £24.95.

l What joy! Domark have made me a very happy man... *Dragon Spirit* is almost here. Anyone who has played around with that very tasty box of tricks, the PC Engine, will be familiar with the game. You control a blue dragon that must fly through a hazardous land of dinosaurs and other weird creatures, fighting your way to the end of each level.

l After a period of 16-bit stagnation, the releases from Virgin/Mastertronic are starting to flood in. Next on Virgin's release schedule is that arcade favourite of mine, *Shinobi*. As the name suggests, *Shinobi* puts you in the role of a ninja warrior that has to battle through various screens to rescue your friends from the clutches of baddies who will no doubt do unspeakable things to them if you fail in your mission. *Shinobi* will be available on September 18th for £19.99.

Booboo Corner

I did indeed make a booboo in last weeks AmigaBLIT column. Some of you may have noticed in the 'ECS Update' news item that I stated that the new Agnus chip within the ECS upgrade includes several new screen modes. This is of course complete porkies! As everyone knows, screen encoding is actually handled by Agnus' sister, Denise (or '8362' if you're a close friend). Oops!

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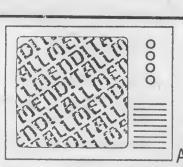

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Spirit of the original

This week the Carey CPC has been kept busy with the latest Domark conversion of a Tengen coin-op title. *Dragon Spirit* is as well done as *Vindicators*, which was the *Amstrad Action* Mastergame a few months ago, and a considerable improvement over *Xybots* (but then, I never liked the original much, either).

There's some frantic action keeping the baddies down, and as ever some extra special end-of-level guardians to occupy your joystick arm. Under close questioning I'd concede that perhaps it's neither the most original nor the most varied of games. But what the hell, if God had meant shoot-em-ups to provide intellectual stimulation he'd have made 'em chess programs *(huh? – ed.)*.

Dragon Spirit, by Domark, will set you back a tenner on tape and £15 on disc. And my bet is you'll agree it's money well spent.

Profitable program

The chaps at SD Microsystems have now released an extended version of their business program *General Ledger*, part of their range of accounting aids for small businesses.

The original, with 64K giving full control of cash and bank accounts, income and expenditure analysis, as well as producing vital reports such as Profit and Loss and a detailed VAT summary, has generally been well received. But one main drawback has irritated a number of users. Between 150 and 200 transactions can be entered into one file, and if that sounds plenty to you, believe me it ain't.

Now an expanded version that makes use of the extra bank of RAM, *General Ledger 6128*, has been released. It almost doubles that original rather meagre limit, as well as offering other refinements such as a Trial Balance report, the capacity to hand monthly standing orders and direct debits and improved menu and screen displays.

Steve Denson, keen as ever to bang the drum on SD's behalf and on behalf of the CPC in general, points out that this upgraded version costs *less than the VAT* on most packages of similar ability for the PC!

General Ledger 6128 costs £29.95, and upgrading from the original a tenner. SD is at PO Box 24, Hitchin, Herts.

Dangerous Multiface

Mark Riley has taken the trouble to write in with Multiface pokes for the fabulous and hilarious Rick Dangerous:

```
poke    87CA,FF (255 lives)
        888B,FF (255 bullets)
        926D,FF (255 barrels of
         dynamite)
```

Incidentally, Mark reckons if you use the Multiface on missions other than the first one (South America), you find that the sprite "boxes" are visible when you play the game. Funny, I don't believe I've had that problem. Perhaps it's something to do with the version of the Multiface you're using, Mark?

He's also given the world a poke for infinite lives in the classic Chuckie Egg: 9B5B,Ø.

"Keep up the good work," he writes, encouragingly: "thanks to Phil Howard's hacking series in Amstrad Action – I couldn't have got these pokes without him." Oh don't be saying that, Mark, you'll be making Phil's head swell, and he'll expect to be paid as well!

In exchange for Mark's good work, does anyone have any pokes for Netherworld? Send these, together with your pokes for infinite holes in Leaderboard to: Steve Carey's CPC Centre, NCE, 4 Queen St, Bath BA1 1EJ.

Sounds familiar

A Mr P. Andrews of Doncaster writes to ask whether there are any genealogical programs for the CPC, and I have to confess I don't know the answer, though I have the feeling that I have seen one. Does anyone have any information about such a thing?

Son of Qualitas

Ray Eckersley, boss of Seven Stars Publishing, tells me that *Version 2* of *Qualitas Plus*, the print enhancer, is now ready. Besides what he hopes is a much improved manual that explains the installation procedure even more clearly, special loaders are now provided for *Masterfile III* and *Protext/Promerge Plus*. The codes for switching *Qualitas* on and off are now ordinary text characters ({, † and }, but redefinable), so you no longer have to go through that business of defining special printer control codes in your word processor. And the font editor is easier and quicker to use.

Qualitas upgrades are available at low cost from Seven Stars: buying from fresh costs £16.95 (disc). Phone 06284 3445.

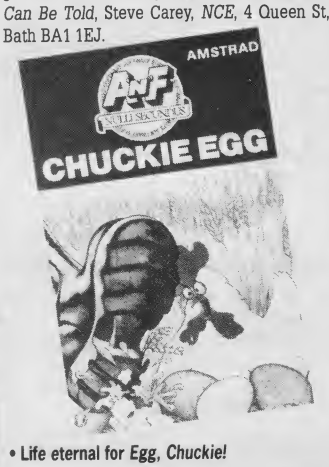
Sheep worrying programmers

Ray Evans of Harlow in Essex was kind enough to send me a print out of KNIFE.BIN, the hidden file in Database's big selling *Mini Office II* that was the subject of discussion in this column some months ago.

Using N. Manuel's *Lookat* scanner program (1985), Ray has given the world a valuable insight into the mind of a very tired and possibly emotional programmer on the verge of finishing what was to become one of the industry's biggest selling projects. Besides a rather unfortunate obsession with sheep, this poor anonymous 22 year old, accompanied by "the good wizard Niloc... Retep the brave and Semaj" (such paucity of imagination), against all the odds, "produced the entimologists *(sic)* dream – the only package where the bugs come completely and utterly free of any charge whatsoever!"

Whatever happened to that crew of young programmers, I wonder? As David Jacobs used to ask, *where are they now?*

I'd be interested to learn, too, of other examples of "secret" messages concealed in games and other programs. Write to: *Now It Can Be Told*, Steve Carey, *NCE*, 4 Queen St, Bath BA1 1EJ.



• Life eternal for Egg, Chuckie!

SPEX

Be happy

After depressing the +3 owning fraternity lately with talk of distorted sound faults, I thought it was about time I gave them a reason to be happy again.

Someone's finally decided to set up a +3 user group, which has to be the best excuse for a celebratory drink I've heard since yesterday's 3.40 from Hadock. The functionally titled +3 Users Group has been started by Daniel Garner, who already runs his own software label and public domain library and has the dubious honour of having had both plugged in previous columns.

His latest venture is this non-printer making group that plans to provide planet loads of +3 specific material with newsletters, disk mags and possibly even a bulletin board. Hopefully it will go some way to redressing the raw deal the latest addition to the Spectrum family gets from the software houses and press (minus Spex) alike.

Membership is £9 a year and for that you get an issue of the group newsletter every month, free public domain software and the use of a help line and cheap mail-order service. A year's supply of +3 contact, the newsletter will be worth having if the first issue's anything to go by. It was 12 page, A4 size mag with a good variety of contents including +3 DOS routines, playing tips and an article on the possibilities of a +3 virus. I really enjoyed it and I know +3ers everywhere will delight in the almost total absence of the lowlier tape-based Speccies on its pages. The other publication produced by the +3UG is a 3" disk-based one called SPECFAX, which I haven't seen yet. A subscription to this isn't included in the membership fee so you'll have to shell out £4.25 or £2 + disk per issue, if you want a copy.

As a special, exclusive, once in a lifetime etc., offer, Spex readers can save £££s on the usual cost of membership. Well, more precisely, you can save a pound and join the +3UG for the reduced sum of £8. To quality for the offer, make the cheques out to D. Garner and mention Express when you send it to 57 Lovers walk, Dunstable, Beds LU5 4BG. The offer only remains open for 3 weeks so hurry! hurry! hurry! as the bloke on the MFI advert puts it.

Poking away

Matthew Wilson of Sussex mounted a take over bid for this column next week by sending in the poking equivalent of War and Peace. Most of the Multiface hacks were a bit ancient and fraying around the edges but with classic oldies being ressurected in compilations and as budget games they're pretty helpful all the same. Here's the most topical ones:

Enduro Racer - Poke 43542,0 and 43643,0
Batman (original version) - Poke 36798,0
720 degrees - Poke 40774,0
Wizball - Poke 37052,0
Scooby Doo - Poke 29674,0

You need a Multiface type device to install them. Matthew will be getting a much hankered over freebie for his poking above and beyod the call of duty.

Another independent Speccy publication has fallen into my grasp. *Spectrum User* comes out every month on tape rather than traditional wood pulp and offers an on-screen magazine on the A side of the cassette with other routines and screen shots to accompany the reviews on the flip side. The issue I saw was fairly unspectacular but great value for money at only 60p (inc. tape and postage). The address for orders is S. J. Howlett, 58 Beacons View Road, Clase, Swansea SA6 7HU.

Airline software, who produce *Spectrum User*, have also got a very interesting catalogue of original utilities and games. Their range of programs extends to about twenty titles with the most impressive sounding ones being a word processor and database for £2.99 each. For a copy of their latest catalogue send a SAE to the address above.

Wafadriven

Following Peter Bellingham's query in issue 40, I know a lot of you have lost sleep wondering if it's possible to convert Tasword Two so it runs on a Rotronics Wafadrive. Wonder no more because a kind reader by the name of Allan Carside has ridden to the rescue with full instructions for achieving this seemingly impossible task. Anyone in a similar predicament can get in touch with Tasman Software who'll supply you with the relevant info. Normally Allan would just get my eternal thanks for his help but because I'm feeling unusually generous this week, he'll also be getting a piece of Speccy software free, gratis and for nothing.

What price tie-ins?

The Spectrum charts these days seem littered with film and TV tie ins. *Robocop* is the obvious example, which has held sway at the top of the chart for months. But are these games any good or are the just freeloading on the back of the huge promotional budgets of the films involved?

So many of these games seem to be just standard shoot-'em-ups or platform games with a few of the sprites changed to make them look a little more like the principal character in the film. Surely when most blockbusting films have highly unoriginal plots – most of them are sequels! – you can't expect the games thay spawn to have original, or even interesting, gameplay. Regrettably though most people seem willing to buy them in their droves just because they've seen the film.

Undoubtedly in the coming weeks we will see the domination of conversions grow even stronger with the launch of the *Batman* games. Let's hope they manage to make the games a little more than run of the mill rehashes of existing standards.

Golden oldie

A golden oldie I've got fond memories for is Ocean's *Cobra*. It's pretty hard to describe; a slick, platform shoot-em-up with great music is about as close as you'll get. Anyway, it's another re-released game now available for a very cheap £2.99 and definitely worth buying. I can feel a case of joystick wrist coming on just thinking about it.

Robin Alway

Talk to me

If you've got any comments, critiscims, suggestions for things you want to see in the column, or tips relating to any area of Spectrum owning send them to Spex, New Computer Express, 4 Queen Street, Bath, Avon BA1 1EJ. Remember to enclose a SAE and be patient if you want a personal, hand crafted reply.

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SECTOR 64 SECTOR

Game on

Wowee kids! Budget games master Players Premier Label has just released two new games. *Moving Target* places you in the role of a Commando who has to find four bombs to place outside the bases of the enemy.

Acting on a top CIA intelligence report, a Commando unit acting under orders from the special United Nations narcotics taskforce, smuggled four bombs into the Duke's (a cocaine baron) coke refinery hidden deep in the South American jungle. Unfortunately, the units were wiped out by the Duke's evil henchmen and the bombs were never put in place.

After playing *Moving Target*, I was rather disappointed that the game was so hard to get into to. The graphics techniques used in the game *Joe Blade* are put to use in *Moving Target* but are nowhere near as hot. When you shoot, nothing comes out of the gun and the only way to determine the shot's effectiveness is to watch for opposing soldiers falling over.

The game proved so frustrating to me I could not get very far at all. The music is by newly formed musicians Sonic Graffiti which for there first effort was rather good even though there was not much tune to it. If you loved *Joe Blade* then you may like *Moving Target*. The game costs £2.99 and is available from Players Premier.

Snake eyes

The second release is *Cobra Force*. You take control of a helicopter which at first is on a helipad. You must take the chopper with all its fire power to rescue POWs scattered around the two way scrolling smooth playing area. while you're trying to rescue the POWs life is made very difficult by enemy fighter planes. The game resembles *Airwolf II* except for the scrolling which dioes not go up and down as well. On your mission you must also destroy the missile silos. Once this is done, you must go up against the awesome secret weapon and once that is destroyed you will be taken to the next level.

Cobra Force has very slick presentation along with very nicely drawn backdrops. The sprites are well animated and help to give the game a good atmosphere. *Cobra Force* is one of Premier's best releases so far. The game costs £2.99 and is available from Player's Premier.

Ian and Mick Jones

Share it out

It looks like the C64 is going to be given another kick of life this Christmas with Commodore re-releasing the cult machine once again, but this time with a gun.

If you have any info and cheats you would like to share with other cool readers of Sector 64, why not pop it in a postbox with a stamp of course to the usual address. Sector 64, Future Publishing, 4 Queens Street, Bath, Avon BA1 1EJ. All donations welcome, honest!

BEEB BOX

One for sorrow

Computer journalists are notorious magpies. The problem being that they get free what everyone else has to pay for, which distorts their prospective on life somewhat. So if they don't get on with a program, it's 'sayonara' and onto the next one.

This often leads to inept reviews being published, and these take one of two forms. There's the 'Oh, isn't this wonderful' type where the hack just regurgitates PR company drivel, of which I can think of several, but which I won't repeat for legal reasons. Then there is the 'keep this pile of **** away from me' type which often represents a lack of technical expertise.

At long last

The point (!) I am getting around to here is that I am a computer journalist so my word on everything is by no means the law. So if you disagree (or agree) violently with me then let me know about it. What I want to see is your opinions on current software. Both items I have reviewed, and those I haven't. I've decided that I am doing far too much work, so I need your help to keep me out of the Betty Ford clinic. Keep it short please. A paragraph of your wit and repartee will satisfy much more than a 10,000 word essay.

Oldies but goldies

I am also going to institute an occasional series called 'Raves from the Grave', where I will muse upon the merits of programs and products long since demised.

The first to receive the call into the limelight is Bitstik. Dating back to around 1984 or 1985, Bitstik made its way over from the then still popular Apple II. It was, and probably still is, the most accomplished piece of CAD hardware and software available for the Beeb.

Its main feature was the input device, a weird sort of joystick cum trackerball cum mouse design. It worked though, and in conjunction with the software which was supplied on several 80 track disks, allowed most operations to be performed without going near the keyboard.

The system was also fast, mainly because a 6502 second processor was necessary to run it. Unfortunately this pushed the price up into the professional class which meant in the days of cassette based Beebs that nobody bought it.

Andrew Brown

Tips time

Here are two simple tips for everybody writing games in machine code on their Beeb.

****FX16,0: this turns off all the analogue ports (speeds computer up by 2 - 3% depending on what is happening)***

****FX178,255: this turns off the keyboard, useful for complex calculations etc., saves between 1 and 2% speedwise.***

****FX178,0: turns the keyboard back on***

****FX16,0: has the disadvantage that joysticks can't be read by the normal legal methods, but that usually doesn't matter as few owners seem to have joysticks anyway.***

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MSXTRA

Joy of joys

You know, it's soon going to be impossible for me to get near my computer due to the number of joysticks I have cluttering my study. Yet another of these devices has dropped through my letter box this week, the latest offering from Quickshot, the £11.95 Wizmaster. This joystick is surprisingly small, all the photos I have seen of it seem much larger than it actually is.

The Wizmaster seems well built, and sports a four position selector switch, one of which is MSX. Therefore this device should work to true MSX standard. I will give you my impressions on its performance in a later edition of *NCE*. One joystick I have been trying out for the last few weeks is the £10.95 Quickjoy (not to be confused with the Quickshot) 124 Turbo. This is a conventional looking joystick, with chunky, sculptured pistol grip handle, two fire buttons and an auto fire option. The joystick also sports a CPC 464 setting, which on Quickjoy's supercharger allows the device to be used as an MSX joystick, ie. independent fire buttons.

Warp factors

Warp Warp is another of the Bug Byte's £1.99 Classic Arcade series, and is one of the games that have been licensed from Namco. As this game was first seen on the coin op scene back in 1981, I didn't expect to see a brilliant piece of software. Well, my expectations were fairly well justified, the game certainly showing it's age. That isn't to say that Warp Warp is a bad game, in fact for it's price it is good value. The problem is the game lacks sophistication.

The game itself consists of you, the player, controlling a character who carries a gun, with which you have to destroy all the badies which appear on screen.
The screen is viewed from above, and in the centre is a warp tunnel that can be used at certain times to warp you to another world, where you will meet a different set of nasties. There is also a maze world, in which you have to lay bombs to destroy the enemy. Sprites appear to be used throughout the game, but as they are all single colour, the game looks very simple, sound effects are pretty good though.

In my opinion, buy *Warp Warp* for the kids, and at £1.99 you won't have been robbed, but adult entertainment it ain't.

Good typing folks.

Keith Neal

Listing corner

We don't see many listings in my column do we? But with such a small space to work in, it's hardly surprising. Still, I have had a few requests for something to type in, so here is a short listing to demonstrate the MSX 1 graphics screen. If anyone has any short (and I do mean short) listings, send them in, all contributions gratefully received.

```
10 REM** K.NEAL 1989 **
20 CLS:COLOUR 1,0,0
30 SCREEN 2:KEY OFF
40 R=RND (-TIME) :C=RND (1) *10
50 FOR D= 1 TO 15
60 COLOR D:A=0
70 X=RND (1) *256
80 Y=RND (1) *196
90 LINE (128, 96)-(X,Y),,B:NEXTD
100 A=A+1:IF A>180 THEN 30 ELSE 50
```

ARCHIMEDES LORE

Loadsa DOS

Having returned to the Archie from a prolonged foray with PCs (though I did start computing with a Beeb, so there's hope), I find it hard to give it all up. As a sort of 'safe house' on the way to to a cure I decided to invest in Acorn's PC emulator. I've heard very good things about it, and have indeed been able to run all kinds of 'dirty' PC games and the like, to which other emulators (and some PCs), would hold their hands up in amazement.

I held mine up in equal consternation when I realised that the Acorn emulator consisted of two disks and a 12 page manual. I'm not a greedy man (How about half fee for this week's column, then? - Ed), but 12 pages of text doesn't seem much for close on £100. While appreciating that you're paying mainly for the programming, it's hard to believe that Acorn couldn't have negotiated a licencing deal from Microsoft for the manual. Virtually every PC clone on the market today includes a copy of the DOS manual, with as many different covers. On the other hand, try buying a copy of the Microsoft manual without the DOS disks.

Opera star gets back up

Since I'm interested in running MS-DOS programs, I figure I need a 5.25" drive. Though some PC software is available on 3.5", the bulk still uses the larger format (they'll catch up one day). For either type of drive I need an external drive adaptor. Having looked at the specs of units from BEEBUG, Watford Electronics and Technomatic, I went for the Technomatic AIDA device as it, quote, 'takes no podule space'. The device is well made and Technomatic's service was exemplary. They responded to a telephoned order (on 01-205 9558) late on Friday afternoon and got me my order by 11:00am on the Saturday morning.

It seems churlish to chastise them in print, but it has to be said that the 'takes no podule space' bit belies the truth. While it's true that the device fits to the floppy connector on the motherboard, a trailing wire for the external disk hangs across to the back of the Archie, where it is firmly fixed to a half-width backplane. There's also a toggle switch for switching the external drive from :0 to :1. The AIDA backplane, in effect, limits you to fitting a podule without a backplane in that slot. Guess how many of those there are?

Bertrum Carrot

The final solution

Don't forget, if you get your CONFIGs in a twist you can return to the default configuration by switching on with your finger on the [Delete] key.

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PCW PATCH

Getting harder

There's a new hard disk for the PCW. Cirtech have launched their 32 and 48 meg versions (with the capacity of 92 and 133 normal floppies respectively). Interface is the standard XT3.9 SCSI and average access time is 28 ms, which even if you aren't familiar with hard disks is clearly very fast. The interface also allows several PCWs to share a hard disk. Details on 0896 57790 – price will be around £530.

Bad memories

Most of us had forgotten about Isenstein's memory upgrade – remember? It's a 512K memory add-on that you fix in to your PCW, bumping up your RAM drive by 512K. I saw the demo version, oh, it's slipped my mind when.

Anyway, Isenstein are now assuring us that it's here at last and being sold 'at the rate of 800 to 1000 a week'. The ramdrive costs just under £100. Details on 0244 822768/ 312986.

Pigg Book of Records

Oldest user

JF Maunder of Surrey was using his Amstrad PCW regularly in May 1988 – at the age of 84.

Britain's oldest man – John Evans of Wales, who celebrated his 112th birthday last week – has never used a PCW.

Plain saleing

The CP/M User Group is organising a sale of second hand computers and hardware on September 30th at the Spring Lodge Centre in Witham, Essex. You can book a stand for £10 – details from Roger Stangroom, 11 Barwell Way, Witham Essex CM8 2TY.

Selecting your club

WC Fields was once asked if he believed in clubs for women. 'Yes', he said, 'if every other form of persuasion fails' thus combining violence and sexism in one joke.

However, violence and sexism are two things you won't find at PCW User clubs. A few forthcoming meetings are **The South Bank Computer Club** every Tuesday at 6.30pm (Neighbourhood Centre, 7 South Bank, Cleveland, details John Chilvers 4 Cranford Avenue, South Bank, Middlesbrough, Cleveland TS6 0AU); the **M25 Club** (Middlesex Club) – details on the 19th and 25th September meetings from Tony Brown on 01 841 3666 evenings; and the **Hampshire PCW User Club** on September 5th. Details from Peter (0252 548660).

Insure deep waters

A Mr J Noon of Bury, reports this month's *8000 Plus*, found that his house insurance specifically excludes his PCW printer. Cornhill offer no explanation, though it may have something to with England's miserable performance in the current test series.

Anyone know why the PCW printer should be classed along with contact lenses, nuclear war and civil insurrection?

Basil Pigg

QL corner

Book worms

If you are programming in assembly language on the QL, technical information about QDOS and the QL hardware is necessary. I have found the following publications very useful, if not essential.

The *QL Technical Guide* is the official source of information about QDOS. It contains almost everything you need to know, but is not particularly readable and is woefully short on examples.

Adrian Dickens' *QL Advanced User Guide* (Adder Publishing) covers much the same ground as the *Technical Guide*, but is much more readable, and has several interesting examples. It also contains information about the Ql hardware and even tells you how to build your own parallel printer port.

Andy Pennell's *The Sinclair QDOS Companion* (Sunshine Books) is a bit short on examples, but has quite a lot of information on writing device drivers, not covered in any detail in the other two books.

My advice is to get hold of all three publications, if you can. Each one has sins of omission and commission, and you will find that they complement each other. One major problem is that they are probably out of print, but you might get lucky and come across a QL user who is selling up and has one or more of them. You may be able to get hold of copies of them through your local library, also.

More bugs

Dilwyn Jones, author of Sector Software's popular Page Designer 2 program, has sent me seven pages of QL bugs. While I have already mentioned some of them, many of them are new to me and I will therefore be listing them in the next few issues. My thanks to Dilwyn.

Here are a couple to be going on with. With JM machines you can't INPUT more than 128 characters to a string in SuperBASIC and CALLing routines longer than 32K results in a crash.

"She who must be obeyed"

One reader has taken me to task over my slightly tongue in cheek reference to computer widows in Issue 40.

This wasn't intended as a sexist remark, but it is a fact that many wives resent their husbands spending a lot of time at the keyboard. I know of two marriages that have broken up with computing as a contributory factor!

QUANTA library

I've just received the latest QUANTA software library list. From time to time, I'll be reviewing some of the more interesting programs which are included in this extensive and useful library.

One stand-out item is Nigel Taylor's disassembler program which should prove useful to assembly language programmers. It converts machine code, like the QL ROMs, into assembly language source code files that can be reassembled.

John Torofex

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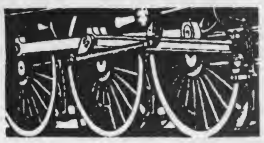

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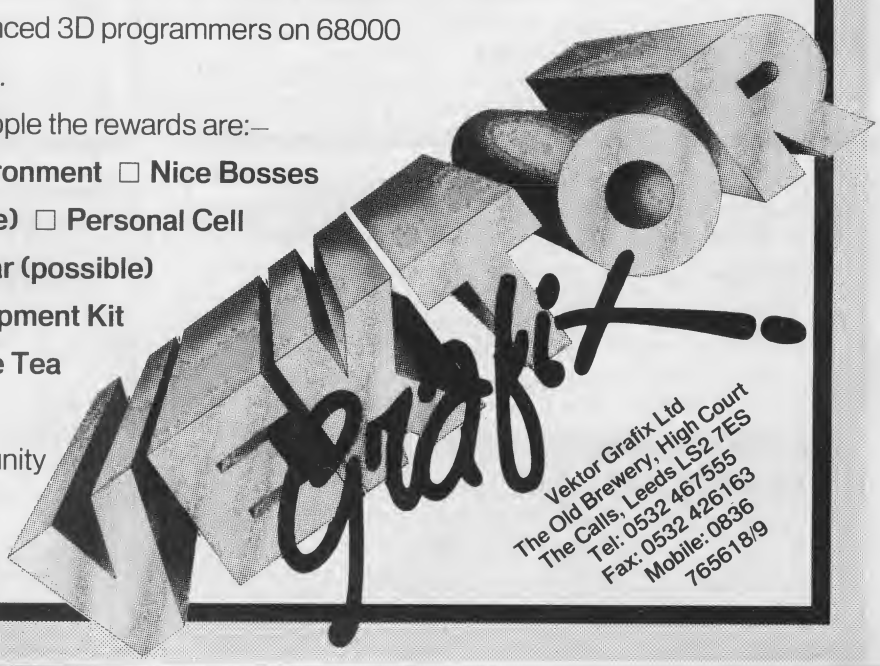

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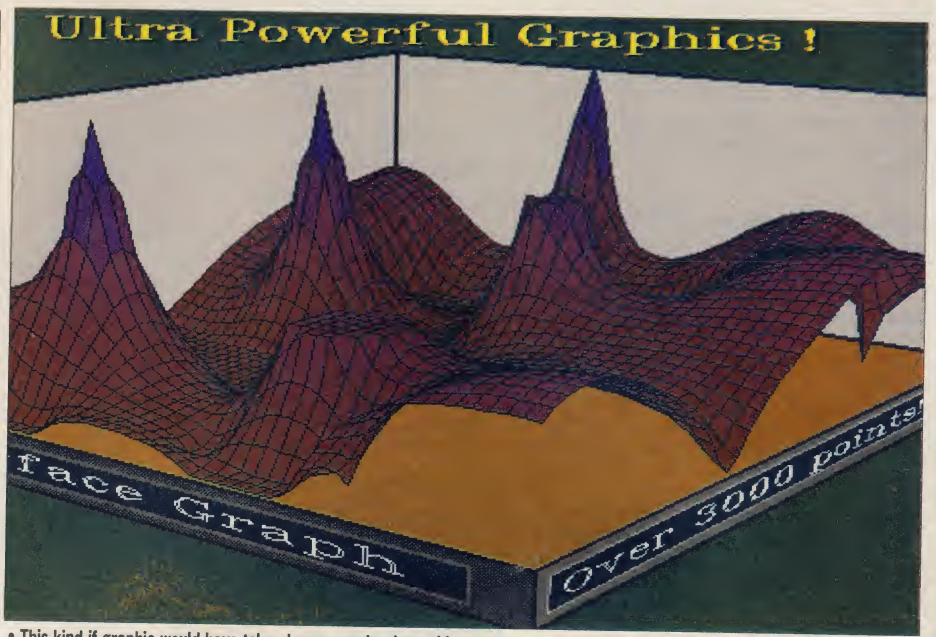


• This kind if graphic would have taken hours, maybe days with an art package or conventional drawing techniques. *Perspective Junior* produced it in under a minute

Presentation is everything. When your putting together an important document, whether it's a report, a proposal or this month's newsletter you're bound to come across the need to present facts as a graph.

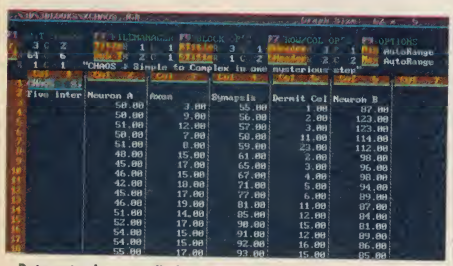
One solution to this problem is to use an art package like *PC Paint* or Degas *Elite* to sketch a pie chart or two, but it's fiddly and requires a lot of time with a calculator to work out all the relevant shapes and scales.

Presentation graphics programs take all the slog out of drawing up charts by giving you a variety of display options which can all be called up at the press of a key using the same data each time. Data can be typed in by hand or imported from another program; a spreadsheet say, or a database.

When you have entered the data, you can label the axes and choose the kind of graph you want to display. The three commonest types of graph are line charts, pie charts and histograms (also called bar charts).

Line charts are your common or garden graphs, with labelled axes containing join-the-dots lines. The graphics programs automatically scale the graph to fit and you can label axes, change colours, shade areas and so on.

Pie charts are particularly useful for showing proportions. A circle is divided into sectors according to the values they represent. The resulting pie can be cut to emphasise a particuler fact. Another common modification is to produce a 3D effect with the pie resembling a multi-coloured coin.



• Data entry is normally into a screen which looks rather like a spreadsheet. You can choose which of the columns are displayed

Histograms represent the data as columns, the hight indicating the amount. The columns can be given a 3D block effect and a third dimension of data can be indicated by dividing the bars up into different colours.

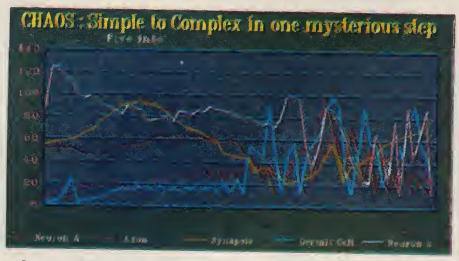
Three programs to produce graphs with their own individual features are Brown Bag's *Easy Presentation Graphics* and Three D Graphics' *Perspective Junior* on the PC and Database's *Mini Office Proffesional Presentation Graphics* on the ST. Similar programs exist on other machines: *ViewChart* on the BBC micro for instance, but these three illustrate the range of fatures you can get.

Easy as pie

EPG takes a straightforward if rather dull approach to presentations. Data is typed into an internal spreadsheet or imported in *Lotus 1 2 3* format. You can chose between 12 styles of graph including the normal line and bar charts, and data can be easily replotted in a different form.

You have very little control over the graph's format; unlike other programs such as *Harvard Graphics* there is no facility for freehand drawing or changing text typeface. Saving the graph is similarly limited, the program using its own data format which cannot be read by any other.

But *EPG* has two saving graces. The first of these is its ability to draw 'pictograms'. These are charts of the kind you often see in American magazines like *Time* where oil sales are represented by stacks of barrels, car ownership by stacks of cars and so on. You can define up to 26 'pictograms' using a built in editor, and the feature certainly produces some striking and clear charts.



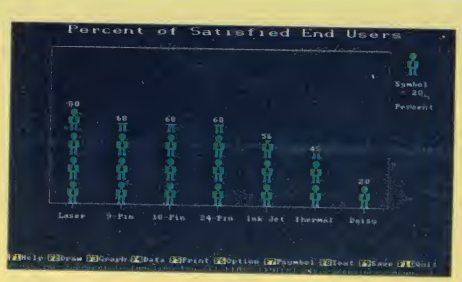
• A straightforward line graph produced by *Perspective*

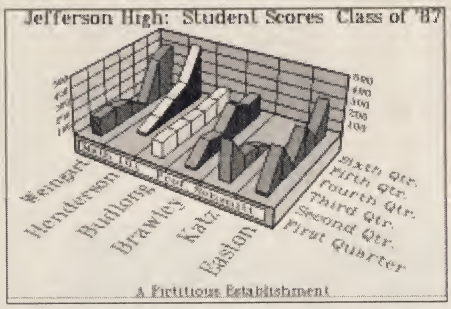
The other outstanding feature of *EPG* is the quality of its dot-matrix output. By making a number of passes over the same area on the paper the program can drive even the simplest dot-matrix to produce very clean, crisp results. The illustration shows how the graphs appear to be almost laser printed. The problem with this is, however, time. It takes nearly 15 minutes to print out a single chart in its 'maximum resolution' mode.

In perspective

Perspective Junior is a very different kettle of fish. From the word go you feel as if this is a professional system. The manual is excellent, but

• Two screens from *Easy Presentation Graphics*. The simple pie and bar charts it produces are thoughtfully labelled, although you don't get much opportunity to change them if you don't like them. The 'pictogram' on the right uses user defined drawings to build up the bars of the graph. With a little care, slick-looking graphics can easily be prepared





• This is a TIFF file directly output by *Perspective* and then incorporated into the desktop publishing package we use to produce *Express*

unnecessary as the self explanatory menu system leads you through the stages to creating your chart.

As with *EPG* data can be imported from various spreadsheets and databases, but *Perspective* gives a far wider range of output options including .IMG and TIFF files. This means that graphs from *Perspective* can be incorporated directly into desktop published documents produced with the likes of *PageMaker*, *Ventura* or *GEM Publisher*. The illustration shows the increase in quality when graphs are directly used in DTP documents.

Perspective is so named because it offers a huge range of 3D perspective diagrams as well as the usual pie and bar charts. The occasions when they are really necessary are probably few and far between but the images *Perspective* produces are certainly striking.

You can alter the shape of the bar representing the data, and also vary your viewpoint of the graph as a whole. You can zoom in on areas and rotate and pan the graph at will. Stretch options allow distortion of the chart, and in combination some very strange effects can be produced with these functions.

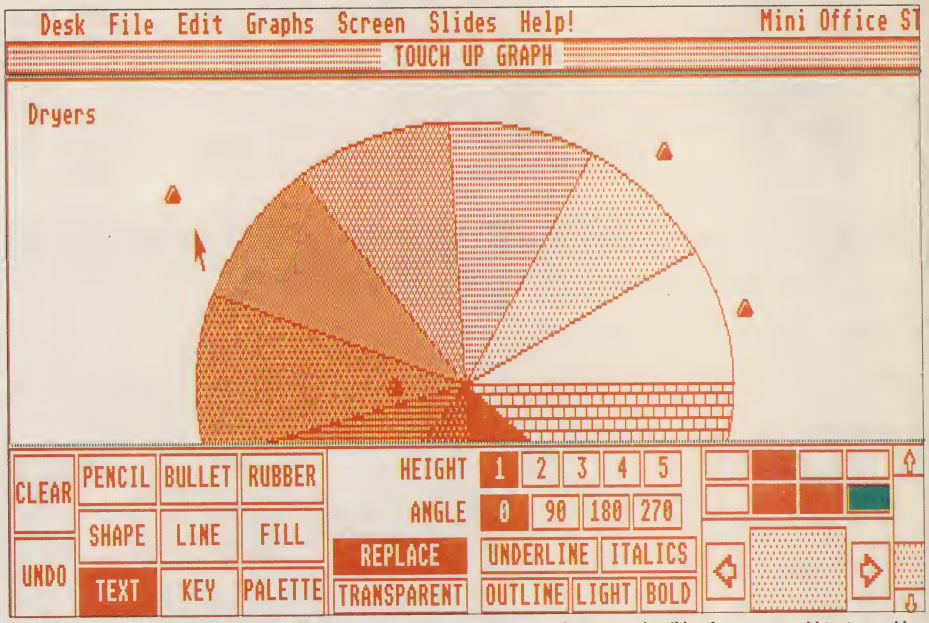
The text on the graph is selectable between four different options, all of which are presentable although more control would have been an advantage. You can also change the colour scheme (Both programs work with all the major graphics adapters, including Hercules).

With the aid of a slide maker and an optional extra driver you can produce top quality presentation slides, and if the budget won't run to that then a slideshow option within the program allows you to put together your own presentations by seamlessly melding graphs together into a sequence.

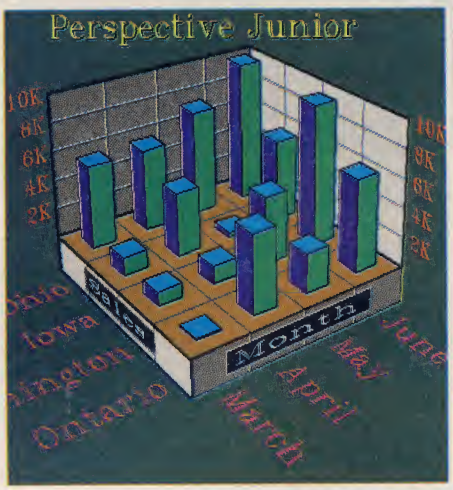
The only real problem with *Perspective* is its lack of PostScript support. Although charts can be printed on a PostScript printer their maximum resolution is 300 dots per inch, well below typesetting standards.

ST action

The ST program is very much the poor cousin of the others when it comes to ease of use. A jumble of menus and file selector boxes leaves the user



• When you've produced your graph in *Mini Office Professional*, you can use the program's editing features to add text, graphics and annotations to create a fully labelled chart

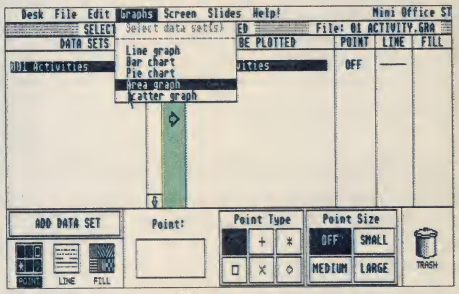


• Perspective's 3D graphs can clearly display data with three elements to it. The above display is the default set up, and by far the most useful one. Changing the shape of the columns or the angle of veiw produces pretty, but uninformative reults

confused about where to start. Control is split between icons at the bottom of the screen and drop-down menus at the top with the result that you don't know where to point next.

The options offered by the program are basic compared to the others: line graph, bar chart pie chart, area graph (a shaded-in line graph) and scatter graph (a line graph with the dots unjoined).

But *Mini Office Professional* does have a feature which the others could well do with: a full



• *Mini Office Professional*'s data entry and preparation screens are unnecessarily complex and confusing

screen editing system. Once your graph has been drawn you can add text and use a simple drawing program to add boxes, arrows and annotations.

Another feature of the program is the slideshow feature. Like *Perspective*, a sequence of graphs can be displayed in order, perhaps to augment a presentation. As *Mini Office* uses Degas *Elite* format to store its graphs, other illustrations can also be incorporated into the show. The file format also means that most ST DTP and graphics programs will happily import the graphs.

Conclusion

If you want to use charts as part of a desktop published document then *Perspective Junior* is an excellent program to do it. It is easy to use and can produce some powerful graphics.

Easy Presentation Graphics is a very much humbler piece of software, but if you need top-quality printed output and your pocket can't manage a laser printer then its well worth a look.

Mini Office is a lot rougher about the edges, but then it costs a fraction of the price. Its flexible labelling makes it ideal for scientific and technical graphing.

PERSPECTIVE JUNIOR

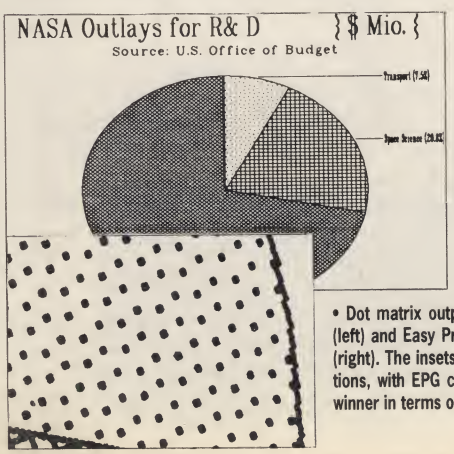
PCs with hard disk • £144 • In Touch • 0222 882334

MINI OFFICE PROFESSIONAL PRESENTATION GRAPHICS

ST • £?? • Database Software • 0625 878888

EASY PRESENTATION GRAPHICS

• PC • £195 • Brown Bag • 01-831 1106



• Dot matrix output from Perspectve (left) and Easy Presentation Graphics (right). The insets show enlarged sections, with EPG coming out the clear winner in terms of print quality

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IN THIS MONTH'S ISSUE...

THE BATTLE FOR THE MID-RANGE MARKET ● Six VGA 286s slug it out ● Surprise winner named ● Amstrad's 286 given a good going over ●
PRINT SPOOLERS ● What they are and why you need one ●
FROM 640K TO 1MBYTE ● Two expansion cards compared ●
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Exciting news, Sega lovers. The publishers of New Computer Express are about to launch a new monthly magazine dedicated to your machine.

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- Your views on all things Sega.
- Playing tips on your favourite software.
- The features you would like to see in the new magazine.

We'll be awarding exciting prizes for the best contributions, so don't miss out. Write to:

Steve Jarratt, Future Publishing Ltd, 4 Queen Street, Bath BA1 1EJ.

Oh, and if all you want to do is register for your FREE magazine information pack, just send your name and address on a post-card to **Sega Registrations** at the same address.

EXPRESS MAIL

Dear Reader

Another collection of comment, controversy, compliments... and Rob Ainsley's replies. Have you got something to say? Make your voice heard in computing's liveliest letters page! Send your contributions to:

Express Mail, 4 Queen Street, Bath, Avon BA1 1EJ

PS. Sorry, but we just don't have the time to give personal replies, whether you include an sae or not. We're too busy putting Express together!

WAS EARWIG?

Whilst skimming through my back issues of *New Computer Express* I notice many references to the phrase "WYSIWYG', although I know what it means I am at a loss how to pronounce it. Is it 'Wuzzy-wug', Wezziweg, 'Woosywog' or what? I would be grateful if you could relieve me of this great problem.

Ross Taylor, Wrexham, Clwyd

• 'Whizzy wig' seems to be the UK standard. What you see is only ever a loose approximation to what is actually printed out. This however would lead to the acronym WYSIOEALATWIAPO which is even less pronounceable.

JOB DISSATISFACTION

I read with interest the news item (*Express* 38) which states there is a shortfall of 50,000 qualified people in IT. Arghhh!!!!

Ever since I've been 18 (I am 27) I have tried for a career in programming. Despite a Control Data Institute course I have been forced back into electronic sales as a job (not career) with all the prospects of Leprosy.

Maybe this is a northern problem; if that is the case, then listen, all you southern employers. I am bright, quick to learn, hard working and would live in a tent if needs be.

If nobody is willing to train people like me then the computer industry has only itself to blame when the British industry sinks slowly down the drain.

Gary Ingram, Wakefield, West Yorks

• It sounds like your best bet is to come down South – maybe stay with a mate or relatives of relatives if you can find some. As someone who did this myself to get a job, three years ago, I have mixed feelings. I found one easily enough, but I resent enormously the fact that I had to leave my family and friends and the area I was born and brought up in.

FAME GAME

That Paul Quinn might not have a brain cell but isn't he getting sort of famous? A bit like Ken Mosley.

Steve Sharples, Bingley

• Some believe the only cell Ken ever had was a padded one.

PIRATE SCUPPERED

You offered to give a free subscription to a certain person from Sheffield a while ago for setting up the Guild of Unemployed ST Users. Well, I am not unemployed, but I am a student (what do you mean it's the same thing?) so I wrote to him asking to join. Imagine my surprise when he sent me back his software list and asked for mine in return. I sent him mine back and he wrote asking for copies of some games.

I am not one of these people who think that pirates are the scum of the earth etc, but I do feel it is wrong for someone to write in to your mag offering a 'service' when it is nothing more than an excuse to pirate software - if you are a pirate, say so. Don't hide behind the facade of being unemployed to try and account for it.

Dave Pelmer, Jarrow, Tyne & Wear

• Our offer to the person concerned has been withdrawn pending further enquiries. Instead of sending him a new copy of Express every week we'll just send him photocopies of the same one each time.

THE PRICE OF GAME

MJ Adams (*Express* 41) brought into the open what I consider to be the most important aspect of buying a home computer: the price (and availability) of software for any particular machine.

A ZX81, a rubber keyed 48K Spectrum, 128 'heatsinked' Spectrum, 128+2, Commodore 64 and various other not so well known machines have all graced our dining table over the years. More recently my son persuaded me to upgrade to the much revered Amiga. One visit to my friendly Amiga stockist later, in Georgian Bath, found me the proud owner of the Amiga 500 with lots of free goodies (VG and star for the salesman).

Six months later found me on the corner of our local street selling matches, old Speccy tapes and back-numbers of declining competitor weekly computer magazine. Why? To try and afford games and various other things for the Amiga. Yep, a bad cock-up on the looking ahead front.

End result .. The ultimate selling of the (fault-free) Amiga, and the resulting blushing about my bad decision.

Happy ending .. yet another advance order for MGT SAM. Could it be a return to the exciting and slightly uncertain world of the early Sinclair machines. Hell, even if it doesn't work properly it will be terrific fun trying to find out why, and being able to chat to its designers on the phone, a rare treat indeed. All this, with good support from software houses makes me tingle with anticipation. As an added bonus, the availability of mountains and mountains of new and old Speccy software to re-discover all over again (now where did I put *Desert Rats*...)

The message is loud and very plain. The price of the software for the trendy all-singing, all-dancing machine you are about to get, may be just in order to try and keep up with the going trend, could be the very nail in the coffin that breaks the camel's back, well, sort of. It doesn't matter how much Atari or Commodore fight over price cuts for their own brand of 16 bit gizmo. If the software houses can't do equally amazing things with the prices of games etc. then what the heck is the good of it to the average punter. Maybe we will one day see the ST being given away free with a pack of ten games from Ocean or Rainbird or whomever.

D F Tremling, Wittering

• A spirited defence of the good ol' 8 bit machines we all have somewhere in a cupboard. We'll be sending you some Speccy software for your SAM as the sender of this week's prize letter.

And there's nothing wrong with mixing metaphors. After all, time marches on its stomach. Incidentally, have you noticed how Bath is 'The Roman City' according to the sign on the A4 but 'The Georgian City' on the A46?

TWO ROMS DON'T MAKE A RIGHT

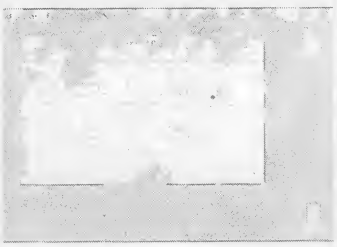
I was surprised to read about the pirate version of the Apple Mac emulator, *Aladin*, in the States which didn't require the ROM chips of the Mac in order to run the emulator.

Several of my computer friends and I already have this emulator in our software collection and have been using it for several months. It consists of two disks. The first is the actual emulator Aladin and the second disk is the systems disk. Once they have both loaded into the ST the computer welcomes the user to the Apple Macintosh and then enters into the operating system where the games/ utilities can be loaded.

The system is very simple to use, although two drives are really necessary for any serious work to be done. I own an Atari 1-40 STFM and think that your magazine is great.

Howling Mad Mike, Leicester

• Hmm. How about Mac viruses – do they also work on the ST under the emulator? I should take a good hard look at those copied Mac programs if I were you...



• Coming to an ST screen near you – if you use dodgy Mac software: a nasty Mac virus like this

CAVY CANEM

Thank you for publishing my letter concerning the job as gained by columnist in your magazine. However, I must put the record straight. I did not attempt to load a Spectrum cassette tape into an Atari computer and I most definitely am not a guinea pig.

It was a C64 tape and I am in actual fact a golden hamster.

S Hunter, Falkirk

• You didn't fool us. A guinea pig with an ST indeed! Everyone knows that cavies prefer PCWs.

CONCEPTION OF QUINN'S

A few weeks ago, *Express* published a top-ten hates list, encouraging other readers to submit theirs. Being in a jovial mood, and with nothing better to do, I faxed in mine. This list contained a few irreverent comments about the Amiga and its owners - big deal.

Now, all this was meant as a joke, and I've had many a debate and friendly argument with Amiga owners about it - OK so far. Unfortunately, a few people failed to see the joke, and decided to insult me, by way of these pages. Well, fair enough. Everyone – frustrated underachiever or not – is entitled to their opinion.

The Amiga when in full flight is nothing short of spectacular - the intro to *Blood Money*, some of the demos for example - I will concede, no argument there. It is the needless design faults I object to, such as the "Oops, we forgot something" modulator, the extremely unreliable PSU supplied with some of the newer ones, which spoil an otherwise great machine.

As Jim Brown stated (*Express* 40) computer owners choose their hardware according to needs and budgets, and most are content with their choice. I own an ST and a PC with a 20 meg hard drive. The PC I use for work (some of us have to write the boring file handling programs), and the ST for leisure (mostly Dungeon Master). If in the future I feel that I need an Amiga, I will not hesitate in buying one. What I won't do is go around ramming it down every non-Amiga owning persons throat.

One last comment to Grant (Express 40). I will write to Express if and when I see fit, with or without your sanctimonious permission. And a little bit of advice, don't call people childish names from a safe distance when you don't have the guts to say them to their face, son.

Paul Quinn, Kilmarnock

• Quite so, Paul. Whether you agree with someone or not, you must support their

right to state their opinion. I can tell that you're in favour of free speech by the way you use your firm's phone to send these faxes.

PAIN IN THE ARTS

In *Express* 34 you asked for artwork to be sent so you could feature it in your excellent magazine and so I set about creating some art work for you. I spent many an hour or two or three or four slaving away over a hot computer, and as yet I have not heard a dicky bird.
Robert Hudson, W Yorkshire

• Response to our appeal for computer art was dismal so we didn't bother to run a feature. We might try it again in the future, maybe offering prizes for the best efforts.

IT'S AN EDUCATION

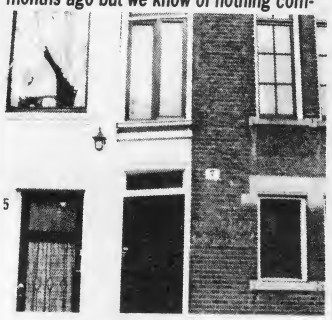
Would you consider introducing an educational section dedicated to news, software reviews and releases etc? I am sure there are lots of parents out there, who read you're magazine, who would find such a section of great advantage in helping them to choose the right type of software for their children to use at home. Should you ask other readers if they feel there is a need for such a section then I am sure the response would be favourable. So come on – ask the question and lets add another feature to your splendid magazine!
NP Grant, Rugby

• Tell you what. We're doing a feature on education in the next week or two; if the response is good we'll consider a column.

DEVIL'S ADVOCAAT

It is understood that there is a large computer gathering in Amsterdam at the moment. I would be grateful if you could let me know who the organisers are and of any clubs in the UK that may be connected with it. *R Schenk, Cheshire*

• There was a big piracy meeting a few months ago but we know of nothing com-



• And you thought that flat in London you looked at was small. This is the building in Amsterdam where all the MSX users in the world will congregate (see Devil's advocaat)

ing up. If anyone does hear of a large computer that's about to gather in that city perhaps they could let us know.

LIBRARY CARD

Two letters in *Express* 39 both focussed on the sale of public domain software. One stating that it is a rip-off and the other that the more you pay, the better the service. I am just starting a PD library.

I believe that our price of £2 per disk fully justifies costs, although with some library who charge £3 per disk, without customer service, then they must be making a profit.

If anyone would like a catalogue send a large SAE to:
Vince Marsters, England

• Oh, what a shame – we just didn't quite have enough space for your address. Tell

MORE TOP TENS!

TOP TEN TIME...

More top ten hates about computing! A bumper selection this week...

KIDS' STUFF

I. Me, because I don't understand BASIC of any sort.
2. Computer mags that ignore you and can't stand criticism.
3. PD that keeps bombing out after you get it home.
4. Lack of humour in other mags.
5. Demos that come with cover disk mags and don't work right.
6. Having to keep swapping disk when copying folders etc.
7. You, if you don't publish this, and my letter which I wrote while looking after our five kids because the wife was out all day.
8. Looking after the kids.
9. The over pricing of games.
10. Amiga owners who are, or must be easily pleased.
Robert Hudson, W Yorkshire

STRANGE BITS

1. Morons who slag off the mighty Amiga when they know its the best home computer available.
2. Idiots who think the pathetic little Sega is superior to the King Amiga! Let me make it crystal clear (like the sampled speech you get on most Amiga games). The Sega is totally and utterly Inferior! OK?
3. Depressing 8 bit computers
4. Pointless 32 bit computers (you know what I'm talking about Archie owners, all four of you).
5. Mail order companies who say in small print "add £2 towards p&p"
6. Independent PD suppliers (everyone knows that Softville and 17 bit are the best for quality PD)
7. Old fuddy duddies who want to ban excellent games such as *Veteran* (MW–ring any bells?).
8. Not enough sex games
9. Not enough gory games (except for *Jack The Ripper* and *Sword of Sodan*).
10. *ST Format, ST Action, Atari ST User, Express*'s Your Format ST column (why don't you replace it with MGT's SAM?), ST portovers, the ST in general really!
Glen Williams, London

• We would have made this the prize letter, but we can't send you any free software, as we just can't imagine what computer you might have.

WILD MONGOOSE CHASE

1. Computer shop keepers who think that because you are female you know as much about computers as a neolithic mongoose.
2. Computer repairers who keep your machine for weeks because 'there's a shortage of parts for the C64' when they haven't even looked at it yet.
3. When they do look at it, say its going to cost £35 as the CP has gone dead and 'there's a shortage of CPs' – the first electronics shop I called sold me a 6502 for £5.
4. Flight sims.
5. PC software that costs £25 and then turns out to be in CGA and has a game play that even said neolithic mongoose would find tedious.
6. Computer mags (you know the ones) which give every game in every format a rave review and then it turns out to be as 5.
7. *Populous*, because it isn't out on the PC yet.
8. Companies that begin with A and end in MSTRAD.
9. Uninteresting PC columns (sorry)
10. Amiga owners, no I'm not jealous, honest.
Dee Dee, Cheltenham

• I'm waiting now for an angry letter from a member of the genus Herpestes signed 'R. T. Tavi' complaining about stereotype images of non-computerate mongooses and saying how it programs in 286 assembly language and keeps its snake killing records in dBase II.

• 'Amazing resemblance... "mongoose' ...

... • 'girlie'

• Has anyone noticed the strange resemblance between a mongoose and a girlie? Well, there isn't much, but some computer shop owners find them difficult to tell apart

DO I HAVE TO SPELL IT OUT?

Two lists of top ten hates that you might like to publish:
1. C
2. O
3. M
4. P
5. U
6. T
7. I
8. N
9. G
10. .

But seriously (or not):
1. The size of the boxes for adverts in your classifieds (you try writing 'compatibility' in one).
2. The amount of paper we use in this computer age when computers were supposed to bring the opposite.
3. Idiots who write viruses.
4. Parents who think their kids are clever because they use computers when all they do is play games.
5. Rip-off advertisers who give computing a bad name.
6. Incompatibility between 8 bit micros with similar specifications
7. Tape based micros which don't have built-in or machine specific data recorders and hence loading problems.
8. The colour command in ST and first BASICS.
9. Job ads in the national press that have nothing to do with computers but the salary is '10k' – do successful applicants get £10,000 or £10,240.
10. Not getting my fix of *Express* every week because the newsagent forgot.
11. People who can't count.
Paul Trainer, Leeds

• Re your point 9, remember Amstrad's definition of a '1 megabyte' disk in their ads for the PCW9512 as 720K?

STEVE'S THIRD LETTER THIS WEEK

10. People who slag off the ST because it's not as good as the Amiga (graphically and socially).
9. Version 1.00 of Microsoft Write for the ST (bug-ridden)
8. People like MH Knight who get four letters printed in the same issue of *Express* (how many did they send by the way? Were all the letters in the same envelope?)
7. People that only play games on expensive computers (what a waste ..)
6. All the different sorts of monitor leads/ connectors/ plugs.
5. Computer magazines that don't go out of their way to inform you of price increase in the issue before the increase occurs, thus leaving you very embarrassed at the front of a long queue in WH Smith (*New Computer Express, Atari ST User*).
4. The penny change you get when buying software from computer shops
3. Games revewers that give over 80% for lastability or whatever. Are they really still playing those games they reviewed over a year ago?
2. A certain computer magazine for the ST that has started putting a disk on the front cover, despite the fact that another ST magazine has been doing the same thing for ages.
1. Mags that offer fabulous prizes in reader surveys, to get you to give them ideas for articles and such like that they will use, sell more copies of the magazine because of, and save money by not using a market research team.
Steve Sharples, Bingley

• Ah, but if we did have a market research team, we'd have to raise the price without telling you again...

you what, there's plenty of space in our new Shopping Express section, where you can advertise your fantastic services and also browse through for the very best bargains. See pages 17-48...

CARTRIDGE GUNNING

How come cartridges have not been used as the main format for games and software? I can see two, perhaps three, great advantages of using cartridges over tape and discs (or disks) but two disadvantages.

Advantages: I. It will be impossible for people, or crackers to break into games.

2. Cartridges are much faster than either tape or disc.

3.Cartridges are capable of storing vast amounts of data cartridge without first switching off the computer, and opening the outer casing.

Disadvantages: 1. Only MSXs and C64s have cartridge slots. Adapters could be made linking a slot to the ROM connections. Unless somebody makes an adapter, I doubt we will ever see cartridges as our major format, particularly as the 16 bits don't have cartridges slots and they would probably be the best sellers.

2.The cost may be another problem. Tapes on the MSX are £9.95 and cartridges range from £10.95 to £25.00 (*Nemises 3, Crazy Cars, Galuellious*).

Wayne Morrison, Tyne and Wear

• Fair points, but as revealed in this week's news, it looks as though even cartridges are now being cracked and copied.

AND DERE'S ONLY TWO OF US

We've all heard about how computer game violence warps the minds of our darling little cherubs and turns them into anti-social destructive maniacs, how about exploiting the fact and start producing games that feature shooting ivory poachers and destroying tree fellers in Brazil with their own chainsaws etc. Maybe then the fruits of our loins will be of some use to the world instead of mugging grannies and slashing car tyres.

Neil Barnes, Birmingham

• Well, Rainbow Warrior from Microstatus lets you go round spraying seals to stop the cullers being able to kill them for fur and other worthy things similar to those you describe, so your prayers are answered. But what's this about an Irish threesome in Brazil with chainsaws and why should they be destroyed?

CLUB STE

I have read about the new STE computer, and I understand that it is simply an ST with a few chips swapped around and some added. Will it be possible to upgrade the ST, either internally or externally, to STE standard? When the STE is released, will it be given its own column, or will it be covered in the "ST Club" column?

Half the space on an average computer magazine's letter-page is taken up with the classic, tired "my computer vs. your computer" argument. Why not cut through this, and help first-time buyers as well, by doing a feature where all the popular makes of computer ie. all those in the "Your Format" section - are specified in terms of memory, processor-power, software base, graphics - and sound-capabilities, business applications, etc., with a comments column for each, and a separate set of each column could be printed, listing the computers in order of performance in each specification, just to clarify the point for anyone still incapable of facing facts. As new computers are released, their specifications could be printed in the same format, and the entire list could be updated and reprinted annually.

Mark Blunden, Bournemouth

• It certainly won't be possible to upgrade the ST to an STE. When it arrives it'll be covered in the same column at the ST though.

The feature idea is one we're planning in the 'near future', either as a guide in Shopping Express (which starts this week with a run-down of PCs – and some really do get run down!) or as a cover feature, maybe in the run-up to Christmas.

HOORAY FOR US

I don't mind Monday mornings (I am retired) – there's the whole week stretching ahead, and who knows what it will bring. I look forward to the weekend since I treat myself on Sunday to a slap up meal in a hotel, but midweek was miserable - until I started to take *Express* which brightens up my Wednesday! I think it's a splendid mag and agree with many of your readers that it is grossly underpriced (possibly your competitors are charging for the nice glossy paper!) May I thank you and wish you all well.

Leslie Barratt, Torquay

• Gosh, well, thanks – we just try to do our best. If you enjoy reading it just half as much as we enjoy writing it, then, er, it means we enjoy writing it twice as much as you enjoy reading it.

MSXTREMELY ANNOYING

I bought *Rambo III* and *Operation Wolf* for my Toshiba HX10 MSX. The former title gave no trouble and loaded first time; *Operation Wolf* however appeared to land as normal at first but then no loading screen appeared. When the program was loaded the keyboard feigned dead and the only way to regain control was a reboot.

I sent the cassette back to Ocean, who sent me a replacement (very quick I must add), but on loading I encountered the same problem. It seems to me the program is bugged, I rang Ocean and was told to send it back to them. I have already paid for postage and phone calls through no fault of my own. They suggested I return it to the shop, but that would mean a journey to Leeds and a hefty train fare. If I returned the program to Ocean would it be possible to exchange it for a different title – one that I could be sure would run successfully.

Mark Armistead, Lancs

• I don't think you have any way of claiming back postage or train fares or anything, so I suppose your best bet is to ask for your money back or a replacement. It does sound like your Op Wolf won't work on the Toshiba MSX, for whatever reason, so it's not of merchantable quality and entitles you to this.

KNOW YOUR RIGHTS!

At present I am busy writing a shoot-'em-up for the Atari ST. Not quite *Xenon II* quality but good enough for a budget label. How do I go about getting it copyrighted? I've read about these things before but can't remember the relevant details.

Norman Tierney, London

• You don't have to register anything or pay any money to get the copyright on a program or a piece of writing; the mere fact of doing it first gives you copyright.

However, if you find that someone's nicked your work later on (actual program code or text, not just 'the idea') it's up to you to find them out, and to prove that you did it first. Clearly then it helps if you've done something like deposited a copy of the program with your solicitor.

A cheaper alternative is to post a copy of the text or the program on disk in a well sealed envelope to yourself (and not to open it when it arrives, of course!) The date on the postmark should provide adequate evidence for most circumstances.

GIRLIE GAMES

You asked what games girlies like playing. Well, I haven't found a PC game yet and my C64 has been out of action for quite a while. I suppose it's anything that's not a flight sim (well, not everything!) I did like *Jet Set Willy* though.

Dee Dee, Cheltenham

• Trying any sort of jokey reply to this letter will only get me into trouble. But thanks anyway.

IF MUSIC BE THE FOOD OF LOVE, CRASH ON

After playing EA's *Populous* for weeks without a hitch, I finally found a bug. While playing on my ST for a couple of hours, my small cousin decided to place his destructive interests on my Casio HT 700 keyboard, which at the time was plugged into the ST's MIDI port. I watched in horror as my walkers continued to potter about their business, but my mouse pointer refused to move.

Brian Sirgour, Bath

• What tune was your small cousin playing? Anything by Bros or Kylie Minogue perhaps? Then your ST's disgusted reaction would be understandable.

STRIKE OUT

I would like to reply to Philip Moor's question (*Express* 41) why does everybody slag the Amiga? Well, the Amiga was born with three strikes against it that it is powerful, versatile and complex .

Firstly its power and versatility upset those who bought a lesser machine rather than save the few quid extra for the Amiga and they spend most of their time writing letters to magazines comparing the two in an attempt to justify to themselves that perhaps the machine they own is just as good but secretly kicking themselves for not saving the extra cash and not only that but it proves they are not happy with what they own.

Secondly you have those who own the Amiga but haven't got the intelligence to progress further than loading games or clocking about on the workbench these tend to be the "AmigaDOS is crap" or "its only good for games" letters frustrated by paying lots of money for a machine that's smarter than they are. Being able to read and write is a must for any computer user and to master the Amiga requires a lot of reading due to its complexity a case in point if anyone read the workbench page in *Amiga Format* September they will have noticed that all the question could have been answered by reading the first few chapters of the supplied manual.

Then finally you have the people who probably don't own computer at all they just like to add fuel to an ongoing argument so they write in to agitate a good example is the shop assistant he's got nothing to say but revels in the flak a case of self indulgence.

Chris Cannon, Essex

OUTRAGED?

Want to reply to something you've read? Get YOUR comments into these pages – fast! Ring the Express hotline on 0225 444439 and your views can make it into print the very next week. You've only got a minute, so keep it

• There is a lot in what you say but first I think while it's true that the Amiga is a massively powerful machine and to dismiss it as a gaming toy is rather dim the reason people say AmigaDOS is crap is because AmigaDOS really is crap and second I would get your Amiga keyboard seen to if I were you because it appears that the comma and full stop keys are not working which makes your sentences look ever so long and breathless because one runs on from the other without any pause in between all the way to the end of the paragraph oh dear mine seem to have stuck as well now.

• The Amiga nice machine shame about the sticky comma and full stop keys sometimes they don't work

SNIPPETS

BUSTERS BUST

Express 35 said I had won a prize of Sleepsafe, the virus buster, in a competition. What happened to it?

Paul Frazer, Cumbria

• Software Horizons, who were to supply the prizes, have unfortunately gone bust. I don't think it's worth bothering about the virus buster now, but if you write in with the name of your machine, we'll try our best to supply software to the value of the prize you would have won. I'm afraid that's the best we can do!

VILE FILTH

I turned to letters page last Thursday and choked. Two pictures of Bros, and if that wasn't bad enough, on the other page you featured Kylie. Did you do it as a shock tactic or has someone in editorial gone mad? I hope you will be receiving my hospital bill soon...

L Sheed, Hampstead

• We accept that the printing of these pictures was unwarranted and some may have found them disturbing. We apologise unreservedly for any distress that may have been caused to readers of Express.

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ATARI ST

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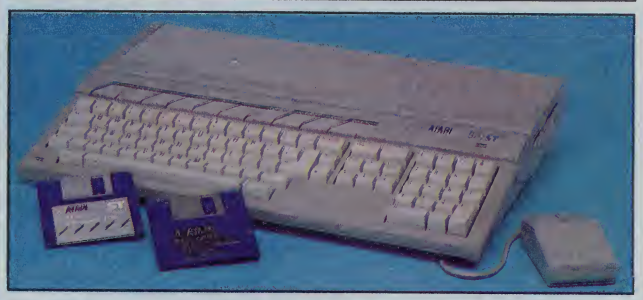

The value for money offered by the Atari ST range is reflected in the Explorer Pack featuring the 520ST-FM computer with 512K RAM. The 520ST-FM computer now comes with a built-in 1 Mb double sided disk drive as well as a free mouse controller and a built-in TV modulator. The new 520ST-FM Explorer Pack includes the 520ST-FM computer, the arcade game Ranarama, a tutorial program and some useful desktop accessories. In addition, if you buy the Explorer Pack from Silica, we will give you the Silica ST Starter Kit worth over £200, FREE OF CHARGE. Return the coupon for details of our Starter Kit and of the full ST range.

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STREET TALK

TAME GA

By Rik Haynes

(Yet) more tremendous tricks'n'tactics from a wide variety of games, thanks to our *Robocop* Competition entrants (sorry tipsters, no prizes for your info this time because you've already entered a competition).

Kick Off fans should be pleased to hear about a new expansion kit that's coming out for their favourite footie-sim. Imaginatively titled, *Kick Off Expansion Kit*, this game add-on will include new player tactics, faster play, stricter refs and weather conditions. It should be out in December on ST and Amiga, price £9.95. Meanwhile, Spectrum and CPC versions of *Kick Off* should be out sometime later this month.

I wish NEC would change its stance over the PC Engine in this country. Still only available as a "grey import", the PC Engine is one of the most cyber and desirable games decks I've ever used. Take for instance, the three new PC Engine games I got in for review this week – *Gunhed*, *Side Arms* and *Pacland* – these games were immensely playable, infuriatingly addictive and very, very audio-visually attractive. Come on NEC, you'd quickly muster a loyal legion of users if you officially sold the PC Engine in the UK, go for it...

And now, the time has come, to face, my final Gameplay... that's right peeps I'm off pastures new. However, before I go I'd just like to say thanks, it's been great fun and I hope you've enjoyed my (outspoken and hopefully entertaining) news, views and reviews ...but more, much more than this, I did it my way!

"***Bard's Tale***: For fast experience, go to Harkyn's Castle at N, E on the top level. There are 396 Berserkers, with three fighters at the front set to defend, the Bard using the fire horn and two Sorcerers with Mind Blade. You will take hardly any damage, and after about three rounds you will get about 60,000 experience."
***JULIAN OLIVER**, Boston, Lincs*

"Amiga ***R-Type***: Type in '[SUMITA]' in the high-scores for infinite lives. PS: Why do you call yourself *New Computer Express* when you've been around for 10 months?"
***N CHILD**, Croydon, Surrey*

"With older **chess** games, it's possible to take (some) advantage over the software regarding non-queening of queening pawns."
***EA COOK**, Cwmbran, Gwent*

"***Carrier Command*** on the Amiga: Pause the game with the mouse button and type '[THE BEST IS YET TO BE]', followed by a press of the '[+]' key. Invincible mantas result."
***B MOONEY**, Washington, Tyne & Wear*

"Honda ***RVF***: Get plenty of practice, try to learn each circuit. Don't panic if you're left at the start, follow the other bikes

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Everybody who gets a tip, cheat, poke or bug published wins a **prize**!

HOW TO CONQUER THE NEW ZEALAND STORY

An extensive collection of tricks and tips on this addictive coin-op conversion.

THE ULTIMATE NEW ZEALAND STORY CHEAT

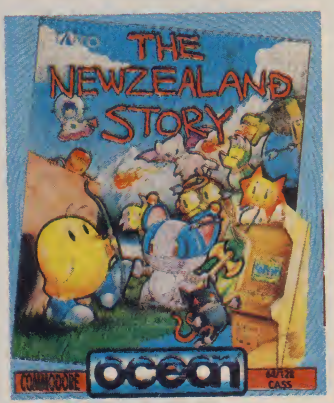
Sorry New Zealander's, we made a mistake back in Gameplay 41, the cheat we printed is incorrect: you should type 'FLUFFY KIWIS' on the title page.
GARY BRACEY, Ocean

NEW ZEALAND STORY WEAPONS WORKOUT

DALE WILKS of Cambridge with some tips on which weapons to use when playing *New Zealand Story*...
ARROWS: The starting weapon, good firing rate, but not very strong.
BOMBS: The business! Good rate of fire, and a large explosion area, so you don't have to be very accurate. Bombs are a must for killing the whale at the end of Level 1.4.
LASER PISTOL: This appears on Level 1.3, and has an excellent rate of fire. One shot kills anything in its path.
CABBAGES (Well that's what they look like!): these are pretty naff. Although they bounce around the screen killing all and sundry, you can only have two on the screen at a time.
SPACESHIP: You get this on Level 2.1, it's easy to fly, and fires humongous great laser bolts that kill everything.
• *Cheers Dale, a humongous reward (Battletech from Infocom/Activision) for your weapon wisdom is on its way.*

TACKLING NEW ZEALAND STORY

Some *New Zealand Story* tips from CLIVE GRAVEN of Sale, Cheshire.
AUCKLAND 1-4: There are many ways to go about killing the end level Whale guardian, this is the most successful



method. After releasing your caged friend, go as near to the left wall as possible without stepping on the nails. Face right and fire at the snow flakes that fall. This will improve your score if you hit them. When you're swallowed up by the whale, in true Jonah style, go to the far left and continuously fire at the whale until the middle blob drops, and the one above wobbles. Then move to the far right and fire until the blob in the middle falls and the one above wobbles. Repeat this, still firing until the whale dies.
ROTORUA 2-2: After killing the first rabbit, go up to the top. Whilst killing anything that moves, go up further to the far right, where the rabbits on balloons will appear. Kill the two that appear and then continue firing at the wall about 1cm below the top. Soon a windmill-like object will appear, which I have decided to name The Warp. If you step into the Warp it will wizz you to the end of the level.
ROTORUA 2-4: Well done, you've just arrived at one of the most nasty levels! As you worry about getting past the bullets, just try to remember it's only a game. Go up and kill all four of the little monsters that appear out of the opening in the scenery. Go down left and come back up and repeat the killing, etc. Wait for your score to pass the 50,000 mark, so that you gain a life or you're given the bottle that gives you a few seconds of invincibility, in order to get past the bullets. Once you're invincible or have the extra life, guide your Kiwi through the bullets to the water and then take a swim.
ROTORUA 2-4: Once you find the position of your friend, you'll need to be armed with the bombs. If your not, play until you are! When you release your caged friend, the end of level monster will appear and attacks you. If you are armed with the arrows you will find it difficult to kill him, so once armed with bombs and the monster is after you, climb to the top of the runs and fire down at the monster till it dies.
WAITAMO CAVES 3-2: At the start of this level, jump up and grab a duck balloon, then travel to the top left corner of the room and go to the far left of the next room. Go down until you get the lettered balloon. Next, go up, first right, down, then first left and down. Once in the next room, go to the far right and up, first right, far right and up until you're faced with the signs: Down and Left. Go down and dive through the water to the right-wall, then go between the waterfalls and put your head above the water until you can fire. Keep firing at the wall to your right until the next warp appears. This will take you into the next level 3-3.
• *Phew! Thanks for the detailed tips, Clive, see what you can do with* Wicked *by Electric Dreams.*

GAME

and pick them off slowly – you'll make fewer mistakes."
***S TUCKER**, Birmingham*

"Amiga ***Super Hang-On***: Type in '[750J']' in the hi-scores. Now when you play again your motorbike will be equipped with a machine gun to blow the other bikes and obstacles away! (Just use the '[SPACE]' bar to fire."
***MARK SUTTON**, Waunarlwydd, Swansea*

"***Test Drive***: If a police car comes up behind you, stay in the left-side lane as much as possible. This prevents the car from overtaking you and thus makes it impossible to recieve a ticket for speeding."
***INDRAJIT CHANDA**, Allestree, Derby*

"***Leisure Suit Larry 2***: Find the Bikini top at the bottom of the pool before leaving the ship."
***AE NEWELL**, Cheltenham, Glos*

"When playing the computer on Atari eight-bit ***Rebound***, always serve slightly in from the far left of the court, and your opponent will always miss."
***SIMON BODGER**, Funtington, Chichester*

"***Gunlaw*** on Commodore Plus 4: Enter the monitor and change AB to AA and 15 to 11 for endless lives."
***NEIL HOPPER**, Uplands, Swansea*

"***Streetfighter*** tip: Reformat the disk!"
***P COLLINS**, Herts*

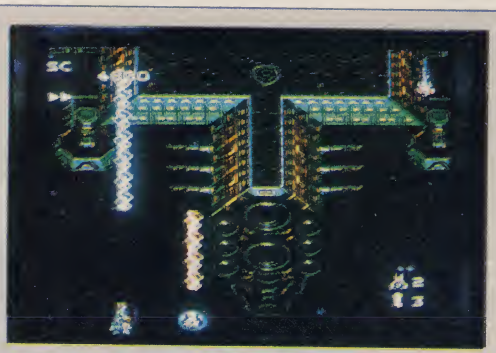
"Don't bother asking Robin Hood for help in ***Defender of the Crown***."
***PETER ANDREW**, London*

"Keep the '[K]' key pressed while loading Amiga ***Defender of the Crown*** to give you 255 knights in your army."
***RICHARD HALL**, Thames Ditton, Surrey*

"Amiga ***Afterburner***: Type 'TOGETHER IN ELECTRIC DREAMS' and press '[T]' to reduce missiles, '[G]' to increase missiles, '[<]' to return to previous stage, '[>]' to advance to next stage and '[I]' to play a sampled sound."
***STEPHEN ALLEN**, Gillingham, Kent*

"ST ***Ikari Warriors***: Type 'FREE RIDE' in the hiscore table for invincibility"
***MARK HUGHES**, Norris Green, Liverpool*

"On ***Karate Kid II***, press the '[P]' key to advance to the next screen."
***DAVID CRAGES**, Gilesgate, Durham*



GUNHED

From Hudson Soft • PC Engine version reviewed

GAME of the WEEK

Ok, *R-Type* on the PC Engine was excellent, but Hudson Soft will never be able to top it with another game, right? You couldn't be more wrong...

GAMEPLAY • Basically, *Gunhed* is another vertically scrolling shoot-'em-up. However, it has got one single advantage over its numerous competitors: it's absolutely brilliant. Everything from *Gunhed's* playability to its sprites are expertly crafted. Even the add-on weapons for your ship are spectacular and very original – and look great, especially if you pick-up an awesome array of kit.

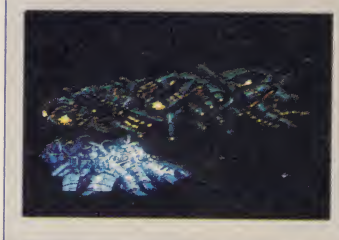
Gunhed reminded us of the cult vertical shoot'em-up, *Star Force* – except *Gunhed's* even better than this classic coin-op, in terms of both gameplay and audio-visuals.

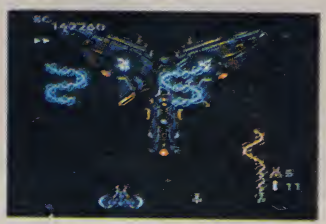
GRAPHICS AND SOUND • *Gunhed* comprises coin-op quality graphics and sound with a typically Japanese cartoon feel to the visuals. In fact, fans of the *Robotech* TV cartoon series will recognise your main ship as some sort of Verotech fighter. The sprites vary greatly in size, design and movement and the the full-screen backdrops scroll fast'n'smoothly.

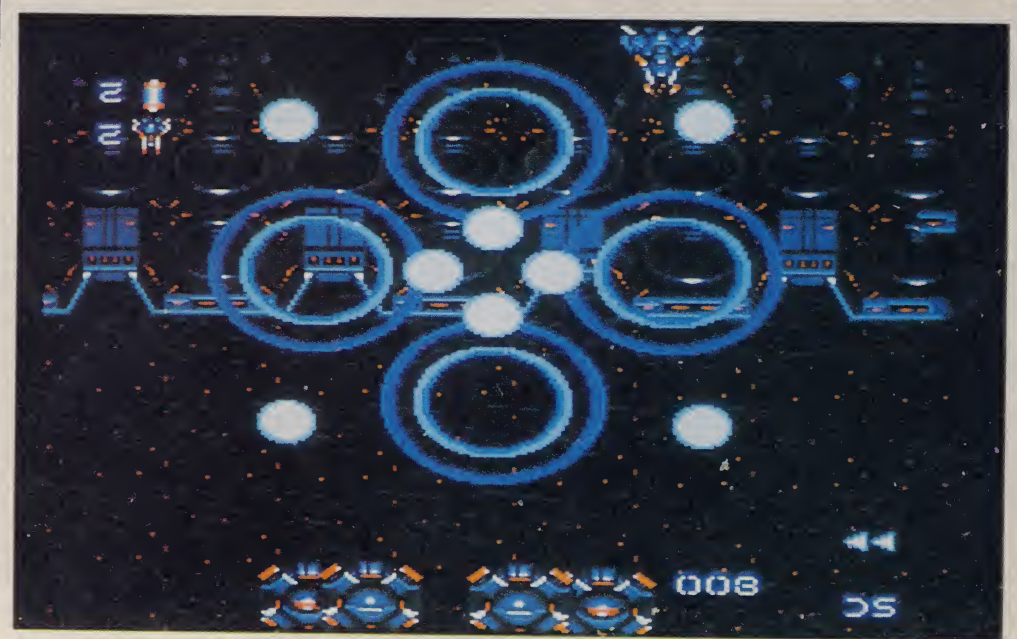
The audio may not be stereo, but you don't have chance to notice it, as you're bombarded of sound spot FX, enhanced by a deceptively soothing soundtrack, which changes with every area.

OTHER VERSIONS • We don't believe there are plans to bring out *Gunhed* on any of the major UK micros. None of them could handle the graphics and sound anyway.

VERDICT ★★★★★
Gunhed is (another) good reason to buy the PC Engine... it's simply superb. Here on *Express* we've fought all week to decide who get's the next go on it. *Kick Off* is the only other game we've played as much this year. *Gunhed* is the best vertically-scrolling shoot-'em-up we've played outside a coin-op.







Special thanks to Mention Technical Services (0436 78827) for supplying all the PC Engine games reviewed in this week's Gameplay.

MINI-REVIEWS

INDIANA JONES AND THE LAST CRUSADE (ACTION GAME) ★★

Lucasfilm Games/US Gold • C64 • £9.99cs, £14.99dk • Also on Spectrum, CPC, ST, Amiga

The C64 version of *Indiana Jones and the Last Crusade* (the action game) is a boring multi-level platform arcade adventure, "enlivened" by colourless mundane backdrops, really irritating sound effects and pathetically unrewarding gameplay. The only thing going for it is that the main sprite does at least look a bit like Indy himself. Of course, the game will sell well – but as you know that's not always connected in any way to style, quality or value for money. It's going to be totally wasted by Ocean's forthcoming blockbusting movie licence, Batman – and deservedly so too.

PACLAND ★★★★

Namco • PC Engine

Another excellent and exciting PC Engine game, which is identical to its cute coin-op parent in all areas: looks, sounds and play. You control Pac over the various landscapes of Pacland, in a horizontally-scrolling arcade adventure, which pays homage to the classic maze-game that created its lively bunch of inhabitants. By the way you can also get *Pacland* on the Spectrum, C64, CPC, ST, Amiga and MSX courtesy of Grandslam – although none of these conversions are a patch on PC Engine *Pacland*.

SIDEARMS ★★★★★

Capcom • PC Engine

A great, and very accurate conversion of the popular horizontally-scrolling shoot-'em-up coin-op featuring some stylish mecha and backdrops. A perfect example of the PC Engine superiority over all the other home games machines, as witnessed by the farcical US Gold Spectrum, C64, CPC, ST and Amiga conversions. The only slight problems we encountered with playing the PC Engine version of *Sidearms* was that it is incredibly difficult to master, and it really loses something special with the absence of the coin-op's simultaneous two player option.

ONE-LINERS • ONE-LINERS

• Buena Vista Software – the computer games side of Walt Disney – is obviously pleased with the success of its first title, *Who Framed Roger Rabbit*, because it's currently working on "a number" of new games projects for this autumn. More details as soon as we get them.

• *Ferrari Formula One*, the popular EA racing-sim, is finally going to make it onto the Spectrum, C64 and CPC this Christmas... after almost a year of development.

• Infogrames has got the UK rights to Broderbund's new American games epic, *Sim-City*, which is due for release next month on C64, ST, Amiga and PC.

• The authors the surreal classic *Archipelagos*, are developing a new sci-fi hovercraft sim, presently going under a working title of *Mangrove*. It should be out from Logotron early next year on ST, Amiga and PC.

• Artronic is taking the state-of-the-art a step further next week, when it releases a PCW games compilation. *PCW challenge* only costs £14.99, and includes four games: *Ace* (shoot'em-up flight-sim), *Formula One* (rac-sim), *Sky War* (shoot'em-up) and *Strip Poker* (supposedly very tame).

• And talking of new compilations, Psygnosis is just about to launch *Triad II* (*Menace, Baal and Tetris*) on ST and Amiga for £24.95 – C64 and PC versions will follow in December.

• Mandarin Software is also releasing an ST games compilation, only this time it consists of six games written with *STOS*, its games creator BASIC.

• Pools predictors on a tight financial budget should check out Blue Ribbon's new *System 8 – The Pools Predictor* program. Out now on Spectrum, C64, CPC, BBC, MSX, Atari 8-bit and C16/+4 for £3.

FIRST PEEK

• An early look at Electronic Arts' new role-playing game on the Amiga, *The Hound of Shadow*. The game is set in 1920s England, and centeres around your characters involvment in murder and the occult. The whole set-up is run under the *Timeline* games system, which lets you give your character a complex interactive personality and detailed backdround. *The Hound of Shadow* should be released towards the end of next month on ST and Amiga, with a PC version following in November.

HIT LIST TOP 5 GAMES

A run-down of our favourite five games released in the last two months. Never mind the charts, *New Computer Express* GamePlay is the best guide to the top games of the moment, every week.

1. GUNHED
Hudson Soft • PC Engine
One of the best vertical shoot-'em-ups we've ever played. The graphics are superb and the speed unbelievable. Come on NEC, get the PC Engine out over here!

2. KICK OFF
Anco • C64, ST, Amiga
Brilliant footie-sim which has dominated life in the Future Publishing offices for the last few weeks.

3. NEW ZEALAND STORY
Ocean • Spectrum, C64, CPC, ST, Amiga
Very cute platform adventure featuring a cuddly kiwi. Twice Game of the Week.

4. CARRIER COMMAND
Rainbird • Spectrum, ST, Amiga
Workable mixture of strategy and shoot-'em-up set in World War II.

5. STARGLIDER II
Rainbird • Spectrum, ST, Amiga
High-end shoot-'em-up with more than a hint of strategy in this space adventure.

Play back

YOUR views on the latest software – call 0225 444439

"Jeff Minter is the God of 68 bit machine code." No name or address supplied
• *He's probably also the patron saint of llamas*

"*Operation Hormuz* on the ST looks a it's running a Spectrum emulator – is this some kind of joke?"
Jonathan Barry, no address supplied

"Any tips for getting through *Gauntlet II* would be appreciated."
Tony Smith, Southend-on-Sea, Essex
• *Can anybody help? You may win a free game for the right info!*

"Has anyone stayed awake long enough to get onto the second landscape of *Archipelagos*?"
Robert Collinson, Leeds

"How dare Greg Williamson say the Bitmap Brothers are overhyped! Amiga *Speedball* is one of the most addictive games ever made, and is easily better than *Kick-Off*. Greg Williamson should put his head down a toilet and stay there."
G Gitara, Leeds
• *Get writing Kick-Off fans...*

"While I agree about *New Zealand Story*'s blistering gameplay, the game refuses to load after my ST has been switched on for more than two minutes. Thanks Ocean, your protection techniques have just done me out of £20."
Michael Orber, Middlesex

"Is a decent cricket game coming out on the Amiga, because Alternative's is crap? When is *Bomber* coming out?"
Philip Palmer, Crediton
• *Perhaps Alternative's cricket game is just a very accurate simulation of our pathetic England cricket squad. Bomber should be out next month*

"*Silkworm* is the best game out."
Nathan Lorry, Surrey

"The worst thing about ST games is the crappy music."
Robert Parkinson, Derby

Are you **delighted** or **disgusted** with your latest games purchase? Get **your opinion** into print within **seven days**! Just call our **24-hour hotline on 0225 444439** ready to speak your mind. Or write on a post-card or the back of an envelope (in less than 50 words) to **Playback, *New Computer Express*, 4 Queen Street, Bath BA1 1EJ** or fax us on 0225 446019.

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Personal computer problems? Express' Agony column has the answer. Write in strictest confidence to Uncle Techtip.

The best tips win a freebie – so don't forget to tell us your address and machine

HELP!
Aged Commodore

I have an old Commodore (four years old) and I can't get any colour pens for my printer plotter, model number 1520. I have tried all local stores but no-one seems to stock them. Could you please help me to find anyone who sells them or has any.
J. Fowler, Carrville, Durham.

• Have you heard of Tandy's, J. Fowler? The high street electronics store with the largest prices in town does a nice line in inflated-price plotter pens (If you can't find the store in Durham, there's one in Sunderland – howay the lads...).

HELP!
Dynamic duo

I have a Commodore 128 and Amiga. I need a reasonable quality printer which I can use with both machines (one at a time, obviously!) without swapping leads and unplugging things. I have read that the new Commodore 1230 printer has both serial and parallel interfaces, so will this fit the bill? Failing that, is there any way of connecting, say a Star LC10 to both machines?

I've written to Commodore to ask them, but I need to know before I die!
Stephen Mercer, Shaftesbury, Dorset.

• A printer that has both serial and parallel interfaces won't let you connect machines bearing each configuration and run them without first having to switch between each interface. This process is usually carried out via almost inaccessible dip switches.

Your best course of action is to locate a two-into-one printer switch bearing serial and parallel interface inputs and one parallel output. With this device (available from many computer retailers for approximately 25 quid) you can connect a standard parallel printer, such as the Panasonic KXP1081 to the output and both machines to the inputs. It's then a simple matter of flicking the knob at the front of the switch box to determine which computer has access.

HELP!
Spectrum monitor

We are at present using a Spectrum Plus 2 and a mono TV with Tasword for word processing at our local primary school.

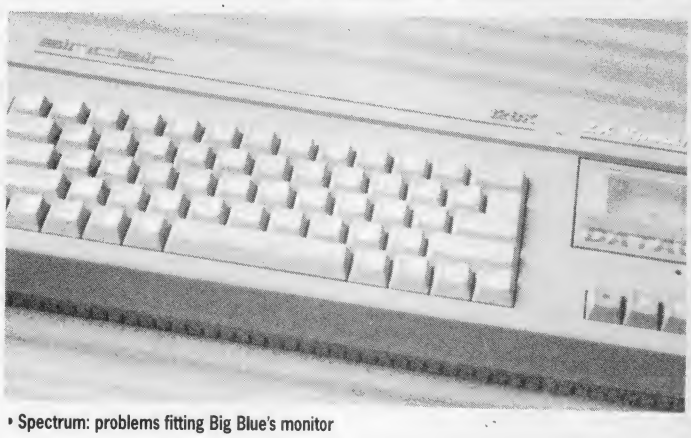
We have recently been presented with a mono IBM monitor model 5151002. Could you please tell me if this is compatible with the Spectrum and if so, what is the pin-out of the monitor (I have the Spectrum pin-out from the manual).
R. Clark MacGregor, Shefford, Beds.

• Forget it, R. Clark MacGregor. The plan's a washout. Bereft of any semblance of possibility, it lies still-born before me. Bung an ad into the incredibly cheap (free) *Express* classifieds and offload it onto some unsuspecting reader. In this way you may be able to raise the wind to purchase – second hand – a monitor suitable for use with the humble Spectrum

HELP!
Jolly Roger

I would be grateful if you could help me with a small problem I have with the game *Rogue*. I own an Amstrad PC1512 with twin drives, colour monitor and 32Mb filecard and often play *Rogue* on this machine.

• Connecting a printer to the Amiga's a simple task



• Spectrum: problems fitting Big Blue's monitor

I have discovered that although it is possible to save an uncompleted game during play, I can't seem to find any instruction on how to load a game I've previously saved and the help file doesn't seem to include this.

Also, how do I get the game *Astro* to work on an Amstrad PC1512? It either fills the screen with squiggly yellow lines or crosses. I have obtained copies of this from a public domain catalogue and two other sources but all the copies behave the same way. I hope you can offer me some advice on these two problems.
Richard Meredith, Poole, Dorset.

• Obviously, your currently enjoying the pirate version of the game *Rogue*, otherwise you'd have access to correct instructions. I'm afraid that unless I receive notice to the contrary in the next few days I shall be forced to pass on your name address to the forces of FAST (Federation Against Software Piracy). Let this be a warning to other pirates attempting to solicit information from squeaky clean Uncle BlackBeard, sorry, Techtip, to help them in their nefarious doings.

HELP!
Go forth

I recently had the extreme good fortune of being given a Jupiter Ace computer from by a friend who'd given up computing *(after owning the Jupiter Ace, I should say that was a wise move – Uncle Techtip).* The problem is I believe the machine

BUG OF THE WEEK

Whilst using the *Quest* database on the Beeb, I discovered a little buggette. Input from the keyboard is not properly vetted, allowing all sorts of silly effects to take place. For example type:

Ctrl+V
2
Ctrl+Q
Shift+f2

Now hold down the Ctrl key and type:
L,Y,E,f1,B,@,B

See what I mean? From the middle of a – supposedly – serious database package, you have just changed mode, corrupting all the data, turned the screen an appealing shade of green and placed a white line in the bottom left hand corner. With some experimentation it should be possible to draw full colour masterpieces...
Rafael Jay, Bath, Avon

• ***Modus corruptus***
The larvae infest data files and can cause sudden destruction of screen RAM when they hatch

uses the Forth programming language rather than BASIC but I don't have any manuals or information to confirm this or to glean any information as to how to program in forth. Can you tell me if my computer is Forth based? Also, is there a user group anywhere in the country? I would very much like to contact other owners to discuss the computer and swap hints and tips. Thank you for your help.
Maurice B. Forster, Gayton, Cambs.

• The Jupiter Ace, huh? The computer does indeed use forth as its in-built programming language and is, to my knowledge, the only machine ever to do so. Forth, once you're acquainted with reverse polish notation and its stack-based structure is a very simple and effective programming language to use. Have a rummage in the computer section of any high street book store for a suitable text to explain the language.

There *is* a user group devoted to the Jupiter Ace. Contact J. R. Charter, 27 Regent street, London SW1. Tel: 0246 37555..

HELP!
Records, fields and files

At the moment I am busy studying on a computer studies course at my local college of higher education. We have just started to learn about the finer points of spreadsheets and databases and although I'm getting to grips with the concept of the spreadsheet, I'm afraid I'm completely lost as far as the database is concerned. Records, files, fields none of it makes any sense, and the more I try to become acquainted with it all the more confused I become. If you, in your infinite knowledge, (well thank you – Uncle TT) could explain this to me in a clear way, I would be very grateful.
I. Hollender, Cox Green, Shropshire.

• With such unstinting praise how could I possibly refuse your cries for help. The database is consists of files. A file can be thought of as a large (electronic) box. You can open the lid and deposit data in the box. Obviously if the data was put into the file any old how it would be pretty difficult to get it back out again in a sensible way.

To overcome this problem the file is divided up into distinct parts known as records. Each record represents one complete item of data that you wish to store in the database file. Now for a digression. Have a think about what constitutes the kind of information you'd want to store in a database.

For example, the Smith Insurance company wants to store information about its customers in a database. Each customer has a name, an address, telephone number, maybe a date of last payment etc. Rather than store each piece of this information as a record, thereby taking up lots and lots of record 'slots' in the database, all related information – name, address etc. – can be stored together in one single record. To do this, the record has to be divided into 'fields' (in the same way that the database is divided into records). All fields of a record are related and describe one piece of information.

So. We have a collection of fields describing one event, person or whatever, which make up one record, and a collection of records, which make up a database file. Fairly straightforward, right? The database itself is used as a convenient repository of data that you want to store in an orderly form and have easy access to.

HELP!
Two computer family

I have both an Atari ST and an Amstrad PCW. I've owned the PCW for several years but have only recently upgraded to the ST. The problem is that I have hundreds of files on three inch Amstrad disks that I would like to transfer to and edit on the ST. I'm afraid I don't know very much about serial connections. Could you please explain in an easy way if there is any way I can transfer the files easily?
M. Orissey, Manchester.

• A problem about which I receive a considerable amount of mail. To start with you'll need a serial port add-on for your PCW. Then you'll need to make up a lead. First, purchase two standard 25 way 'D' connectors (female) and a length of cable containing at least six wires. All items are freely available from the Maplin catalogue or any reputable electronics supplier. You'll also need a soldering iron rated at about 15 watts and a multimeter. The latter items will cost you about £10 each.

Connect one of the D plugs in the following way: a wire each to pins 1, 2, 3 and 7. Next, connect the second D plug in the following manner: the wire from pin 1 to pin 1, pin 2 to pin 3, pin 3 to pin 2 and pin 7 to pin 7. These pins provide the protective ground, transmit, receive and signal ground signals respectively. Finally, test the cable for secure solder joints with the multimeter.

You now have a cable which will allow the two machines to communicate via their respective RS-232 serial ports. Now you're going to need some communications software to control all the hardware you've been building. Because the Atari ST is a popular home computer there is a vast quantity of free comms software available from the public domain. And the PCW's CP/M operating system means that it too has an enormous collection of PD to rely upon. Have a rummage through the *Express* classifieds wherein you'll discover a large quantity of PD libraries advertising their wares. Acquire comms software for both machines which supports the X-MODEM file transfer standard. Connect the machines together with the RS-232 cable, boot up the software, select X-MODEM and transfer your files...

• The PCW: transferring files to the ST is no problem, as long as you have a soldering iron and plenty of money

• Fitting a V30 will accelerate the Amstrad

HELP!
Faster chip

I own an Amstrad PC2086 computer. Can you tell me whether replacing the 8086 central processing unit chip with an NEC V30 would make any significant difference to the performance of the machine?
M. G. Miller, Sheffield.

• The NEC V30 will indeed increase the performance of any machine in which it's used as a direct replacement for the 8086.

HELP!
Got a new Tosh

I have read your magazine from issue 10 (when I first found it) and find it most enjoyable. I presently own a Toshiba HX-10 MSX which I find is one of the best eight-bit machines around.

I'm presently trying to finish the *Maze of Galious* and am stuck in world 5 at the deep water. I'd be very grateful if anyone out there has any hints! The only items I'm missing are the oar, the carpet, the trumpet shell, the vase and the dagger. I'd be very grateful for any hints regarding these as well. Finally, I enclose a routine to give infinite lives on *Hunchback*. I'm afraid I can't claim complete authorship for this, but some people may not have seen it before.

```
BLOAD"CAS:"
POKE 28370,0
DEF USR=&H9000
A=USR(0)
```

Type in the above and run it. The cassette will then start to load.
Tony Fryer, 59 Chescombe Road, Yatton, Avon BS19 4EU.

• Thanks for the *Hunchback* wrinkle. If anyone can help this guy with his Maze of *Galious* problems drop him a line at the above address.

HELP!
Book review

Could you please recommend a general computer studies text book for me? I am about to start a computer science course and need to try and learn something before I begin the course. I do know a little about computers so don't need a complete beginners book but rather an introduction to the layout of computer systems. Any help would be much appreciated.
B. Britton, Dulwich, Sth. London.

• I have just the book for you! One only, going cheap. Not five, not three pounds ten, but to you Mrs, only five and a tanner (oh, shut up!). Rush out this instant and invest approximately 15 quid in a copy of *Structured Computer Organisation* by Andrew Tanenbaum and published by Prentice-Hall International. "It's really unputdownable, a smashing read" - *The Sun*.

COMPUTER CHAOS

More true life computer anarchy from the archives of Mel Croucher...

M.O.D. Whitehall.

Five audio cassette tapes are removed from the Ministry of Defence word processing department. They contain highly classified data due to be encrypted into the 'War Book': a document which tells the Powers That Be what to do when World War Three begins.

Over the next12 months, 115 more tapes disappear. Three years later, the War Book is needed for an exercise, and a major security alert blows up when it cannot be traced. The 'spy' is traced to the computer department that deals with word processing. His flat is raided and sure enough, fifty of the cassettes are found.

Although the culprit resigns from the M.O.D. and is charged under the Official Secrets Act, all charges are dropped to avoid any publicity. The publicity that is to have been avoided is as follows: the M.O.D. have no back-up tapes or disks, internal security fails to detect that the tapes are being removed on a regular basis, the War Book does not exist for three years before anyone notices and finally, the cassettes have been put to a subversive purpose.

They have all been taped over with bootleg rock music, except for one which contains a lesson in holiday German.
(*Daily Telegraph*)

MIR, Outer Space.

On September 7th 1988, the Soviet-Afghan crew of the Soyuz-TM-5 go for re-entry into Earth's atmosphere. The computer refuses to obey, and tries to hijack them back to the MIR space station. When the software is checked out, it is discovered that the computer believes the crew to be a Soviet-Bulgarian mob blasted off the previous June. Soviet officials admit that not only was the command computer fed the wrong data, but the crew were in the wrong space craft.
(*Aviation Week*)

Bogata, Colombia.

A transfer instruction for $13.6 million is received by a London bank in May, allegedly from the Director General of the Colombian National Bank. It is destined for an Israeli bank in Zurich, but gets diverted to New York and ends up in the account of Robert Russel.

$8 million is transferred to another Israeli bank in Panama, where it gets collected in $500 notes, and the rest is telexed to Miami and withdrawn. The whole operation is achieved via a Siemens EDX-200 and a home-made plugboard.

The operation remains undiscovered until the following October, when a non-standard toggle switch is spotted by a telephone engineer.

An investigation is launched into this massive fraud, but grinds to a halt when the computer disappears, and the investigating Colombian Senator and Attorney both suffer rather unnatural deaths.
(*The Internationalist*)

HMS Hermes, South Atlantic.

While the rest of the crew is engaged in fighting the Argentines, the 34 year-old Chief Petty Officer in charge of the Pay Office accounts computer is engaged in other enterprises.

He diverts cash payment slips before they can be entered onto the computer, and the loot ends up back home to cover a series of debts that he has run up.

When hostilities cease, the flagship's crew look forward to spending the £12,000 cash float on a few beers, but find the coffers somewhat depleted.

The Officer is busted, court martialled and dismissed from the Senior Service. The computer software is rewritten. The patriotic press bury the story.
(*Navy News*)

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Bloodwych

ARGUE! BARTER! LIE THROUGH YOUR TEETH!!!

Atari ST Screen Shots

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Atari ST	£24.99
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Commodore 64 (tape)	£9.99
Commodore 64 (disc)	£12.99

As the people of the Bloodwych awake to a new dawn, they find a stranger in their midst – from one of many races he has come. His task; to halt the demon that lies dormant within the Castle of the Bloodwych.

Unification of the Crystals of Sanguis will secure the Behemoth in his lair for all eternity. Should they remain separate, then he shall rise to bring darkness into the world.

This unique role-playing fantasy game allows greater interaction with the environment than has ever been seen before. Argue, barter, negotiate – even lie through your teeth! The fully implemented personalities of all the characters in Bloodwych allows a rich style of role-playing that has only been dreamt of.

With one or two player simultaneous mode, this is the game that you've been waiting for. Bloodwych for those that dare!

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Miracle WS4000 V21-V23 Modem.	£139
Miracle WS3000 V22bis Professional Modem.	£377
Miracle Keycard 3000 Internal Modem V22bis.	£377
Amstrad MC2400 Internal Modem V21/V22/V23.	£193
Amstrad SM2400 External Modem V21/V22/V23.	£239
RS232 Serial Modem Cable.	£16

RIBBONS

Epson FX800/LX800 Branded (also MP165, Juki 5510).	each	£5.00
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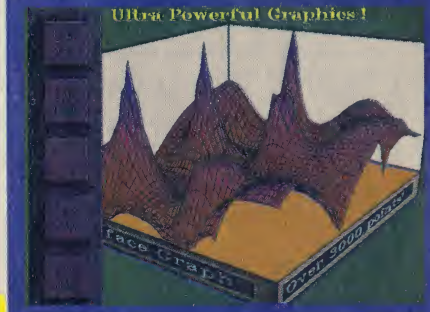

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